

**CONTAINS:
SEPTEMBER
1991 UNITED
STATES
CLIMATE
SUMMARY**

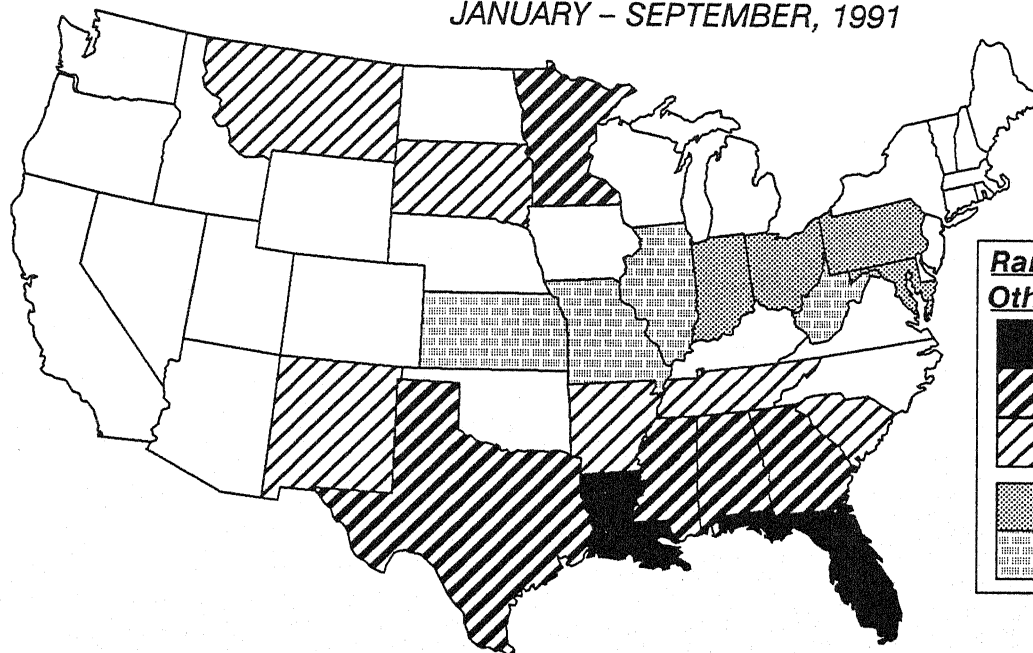
WEEKLY CLIMATE BULLETIN

No. 91/40

Washington, DC

October 5, 1991

PRECIPITATION RANKINGS BY STATE JANUARY - SEPTEMBER, 1991



Ranking With Respect to Other Jan - Sep Periods:

| | |
|--|---------------------|
| | Wettest on Record |
| | 2nd - 10th Wettest |
| | 11th - 20th Wettest |
| | 2nd - 10th Driest |
| | 11th - 20th Driest |

The first nine months of 1991 brought sharply contrasting precipitation patterns to the United States. Recurrent, heavy showers and thunderstorms in the Southeast, a wet monsoon season in the southern High Plains, and a series of spring and early summer storm systems through the north-central states combined to generate the wettest January - September period on record in two states [FL, LA], and one of the 20 wettest such periods in 11 others [AL, AR, GA, MN, MS, MT, NM, SC, SD, TN, TX]. In between the dampness farther north and south, a tranquil spring and summer helped create unfavorably dry conditions from the central Great Plains eastward to the mid-Atlantic. Four states [IN, MD, PA, OH] observed one of the 10 driest January - September periods since 1895 while four other states [IL, KS, MO, WV] experienced one of the 20 driest such periods in the last 97 years.



UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER
CLIMATE ANALYSIS CENTER



WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF OCTOBER 5, 1991

Northern Alaska:

SCATTERED LIGHT PRECIPITATION DECREASES DEFICITS.

Most locations recorded 5-20 mm of rain, eliminating significant six-week deficits [Ended after 11 weeks].

West-Central North America:

WET SEASON STARTS VERY SLOWLY.

Little or no precipitation has fallen across most of the region since undulating rains soaked the coast in late August. Shortfalls of 50-200 mm have accumulated during the last five weeks as only a few locations along the immediate Canadian coast have received over 50% of normal precipitation. The most severe moisture shortages have gripped the Pacific Northwest, where less than 20% of normal precipitation has fallen since early September. Many inland locations, with normals as high as 75 mm, have measured no precipitation during the period [5 weeks].

Central North America:

TEMPERATURES MODERATE SOMEWHAT.

A widespread cold snap engulfed much of southern Canada and the central and eastern U.S. as the week commenced, but milder air spread into many locations by week's end. Weekly departures of -2°C to -4°C were restricted to south-central Canada, the northern Plains, and the upper Midwest. Prior to the intrusion of milder air, lows dropped below 0°C as far south as eastern Kansas and daily departures reached -11°C [Ending after 3 weeks].

South-Central Great Plains:

DRIER WEATHER PREVAILS.

A second consecutive week with little or no precipitation brought to an end the wet spell [Ended after 13 weeks].

Europe:

WIDESPREAD PRECIPITATION STOPS DRY SPELL, BUT ABNORMALLY WARM CONDITIONS CONTINUE.

Moderate to heavy precipitation throughout much of Europe brought an abrupt end to the recent dryness. Most of the British Isles, southern Scandinavia, the Benelux countries, eastern France, northern Italy, central Europe, and Yugoslavia recorded 30-100 mm of precipitation, with much of

extreme eastern France and Switzerland deluged by 100-225 mm. Daily totals reached 150 mm in Switzerland [Ended after 9 weeks]. From central Europe eastward, however, the mild spell continued as temperatures moderated from eastern France and northern Germany westward. Weekly departures of +2°C to +3°C were observed at most locations, although portions of Czechoslovakia, the Balkans, and the western U.S.S.R. recorded departures of +3°C to +5°C [10 weeks].

6. Southeast Asia:

LOWER RAINFALL TOTALS MEASURED.

Typically wet southeastern Thailand recorded 100-250 mm of rain while lesser amounts (50-100 mm) fell across southern Vietnam. The decline in weekly rainfall totals dropped six-week moisture surpluses in Thailand to below 200 mm, implying, with no reports of flooding across Cambodia, that problems associated with excessive rainfall have significantly diminished [Ended after 9 weeks].

7. Southern Japan, the Ryukyus, and Taiwan:

TROPICAL MOISTURE CONTINUES DRENCHING REGION.

Heavy showers brought 80-200 mm of rain to most affected locations in southern Japan and the Ryukyus, allowing six-week rainfall surpluses to reach 80-300 mm. Farther south, Typhoon Nat failed to strike Taiwan a second time, but moisture from the storm dropped another 150-360 mm of rain on the eastern half of the island, where up to 645 mm more than normal rainfall has been measured since late August [4 weeks].

8. Indonesia:

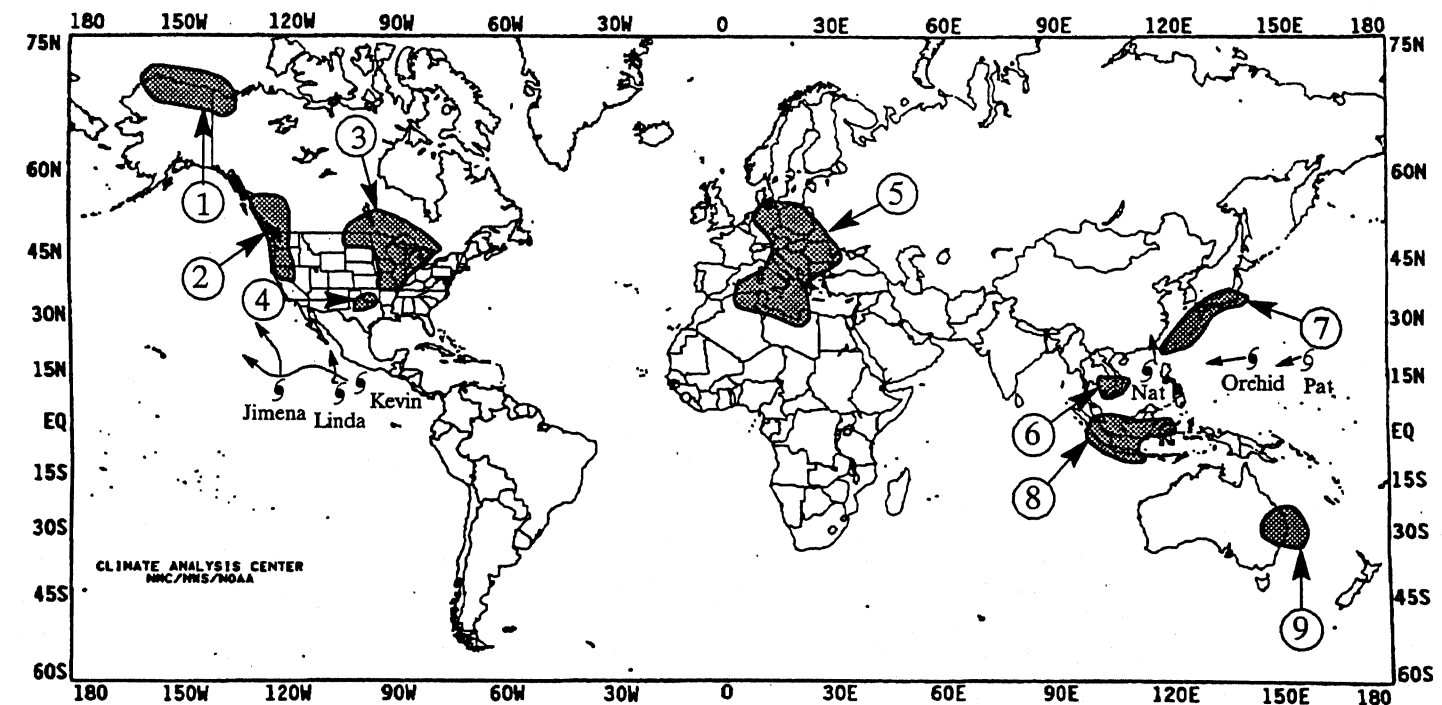
EXCEPTIONALLY DRY CONDITIONS GRIP THE ISLANDS.

Only spotty weekly totals of 20-40 mm have fallen on most locations since late August, creating rainfall shortages of 105-310 mm across many areas, particularly on Sumatra, Kalimantan, Java, and Celebes [5 weeks].

9. Eastern Australia:

DROUGHT CONDITIONS INTENSIFY.

Little or no rain again fell across the region, and totals since late August exceed 20 mm only at scattered locations across the southern tier of the afflicted region. During this period, a few southern locations have measured as much as 40% of normal rainfall, with percentages decreasing northward through the region [10 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF SEPTEMBER 29 – OCTOBER 5, 1991

Torrential rains in Florida, severe weather in the Great Plains and Midwest, and a summer-like heat wave in the Far West marked the start of October. Strong thunderstorms generated over 10 inches of rain in northeastern Florida and produced extensive flooding around Jacksonville. Hardest hit was the Mandarin area which received over 7 inches of rain in a 24 hour period, leaving numerous roads under water, according to press reports. Elsewhere, severe thunderstorms rocked the southern Plains and Midwest, generating heavy rains, wind gusts over 70 mph, and tornadoes in Texas and Illinois. Extensive damage to several homes was caused by a tornado that touched down in central Illinois. Farther west, hot weather baked much of California and parts of the Pacific Northwest. Highs over 100°F were observed across southern California and the interior valley's to the north. Numerous daily record highs were established from Arizona to Washington, including a high of 100°F in downtown Los Angeles, CA on Tuesday. The hot, dry conditions aided the spread of several small brush fires in Los Angeles, according to press reports. Meanwhile, record cold gripped the Northeast as the mercury dipped to 32°F at Buffalo, NY Monday morning, tying the lowest temperature ever recorded in September. Caribou, ME observed the first ever measurable snowfall in September when 2.1 inches fell on the city late Sunday and early Monday. Elsewhere, heavy rain drenched southern Alaska with over 8 inches at Yakutat.

The week began with a cold front in the Northeast. Thunderstorms accompanied the front, generating wind gusts to 55 mph in southern Maine, while to the north snow blanketed northeastern sections of Maine. The heavy, wet snow downed power lines, knocking out electricity to as many as 10,000 customers in Aroostook County, according to press reports. To the west, crisp, Canadian air chilled parts of Michigan and New York, producing record daily lows on Sunday. The unseasonably cold weather shifted to the east, yielding more record daily lows Monday morning from Michigan to Massachusetts. Meanwhile, a warm front moved from the Ohio Valley into the southern Great Lakes Monday. Record daily highs were established in southern Michigan as readings soared into the eighties while to the north of the front morning lows dipped into the twenties across northern Michigan. Farther south, strong thunderstorms doused northern Florida, dumping over 5 inches of rain in Jacksonville. Thunderstorms also dotted the Gulf Coast, producing heavy rain and tornadoes in southern Texas on Tuesday. Elsewhere, unusually hot weather enveloped the Far West. Record daily highs were set from California to Washington on Monday and Tuesday as the mercury exceeded 90°F as far north as southern Oregon.

During the last half of the week, the heat in the Far West persisted. High temperatures were as much as 20°F above normal at locations in California. To the northeast, a cold front pushed

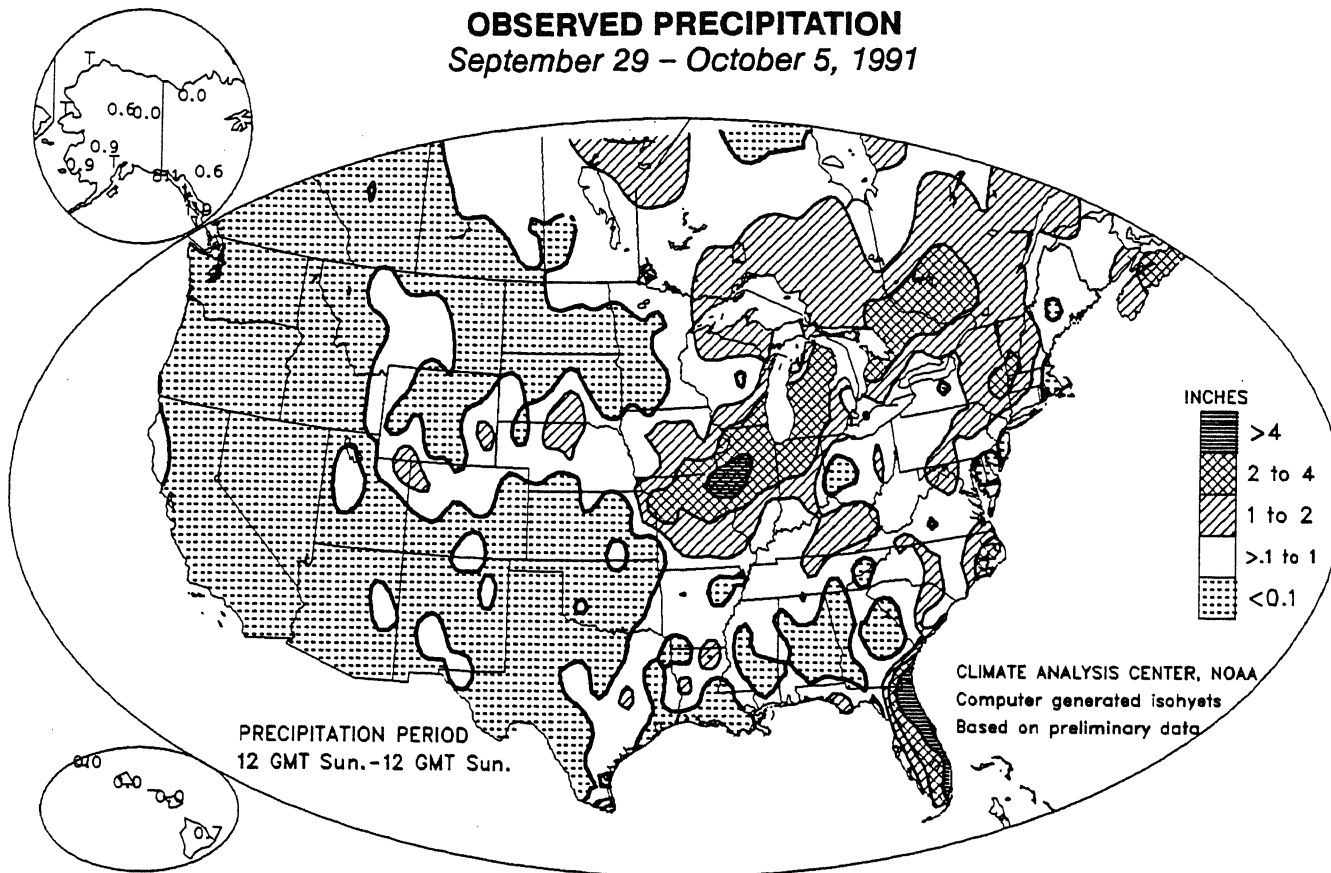
rapidly out of south-central Canada into the northern Rockies, and northern and central Great Plains, spreading snow from Montana to South Dakota. Nearly half a foot of snow blanketed the Black Hills. Severe weather broke out along and ahead of the frontal system as it moved into the Mississippi Valley. Heavy rain and wind gusts over 60 mph accompanied storms that moved through the Midwest. Behind the front, winter-like weather overspread the northern and central Plains and Rockies. Low temperatures dipped into the teens in Montana on Saturday morning while light snow spread from eastern South Dakota into Minnesota. The front raced to the East Coast by late Saturday, dumping nearly 3 inches of rain in eastern North Carolina. A storm system off the east coast of Florida produced heavy rain in Florida as over 7 inches of rain fell on already-saturated ground, causing more flooding around Jacksonville.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) occurred across the Florida Peninsula, the middle Mississippi Valley to the northern Great Lakes, north-central New England, southern Alaska, and scattered locations in the central Appalachians, eastern Ohio Valley, lower Mississippi valley, and southern Texas (Table 1). Light to moderate amounts fell on the mid-Atlantic, the South, the eastern half of Texas, most of the northern Plains and Mississippi Valley, the central Rockies, central and western Alaska, eastern Hawaii, and the remainders of Florida, New England, the Ohio Valley, and Great Lakes. Little or no precipitation was measured in the central Plains, western Texas, the Far West, eastern and southwestern Alaska, and the remainder of the Hawaiian Islands.

Unusually warm conditions prevailed west of the Rockies and across the eastern one-third of the nation (Table 2). Weekly departures between +8°F and +11°F were prevalent across California, southern Arizona and Oregon. Temperatures averaged +2°F to +7°F in the Intermountain West, the Deep South, Ohio Valley, mid-Atlantic, central and southern Florida, and New England. Near to slightly above normal temperatures were confined to the western two-thirds of the Gulf Coast, the lower Mississippi Valley, east-central Great Plains, the Rockies, and the Hawaiian Islands. In Alaska, abnormally mild conditions persisted for the third consecutive week. Weekly departures between +8°F and +10°F stretched from the west-central to the northeastern corner. Departures of +2°F to +4°F were common across the remainder of the state.

Unseasonably cold weather dominated the Great Plains, upper Midwest, and northern Florida (Table 3). Weekly departures of -4°F and -6°F prevailed from eastern Montana to Michigan. Near to slightly below normal temperatures were common from the central High Plains to southern Texas, mid-Mississippi Valley, northern Florida, and in extreme southern Alaska.

OBSERVED PRECIPITATION September 29 – October 5, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F) September 29 – October 5, 1991

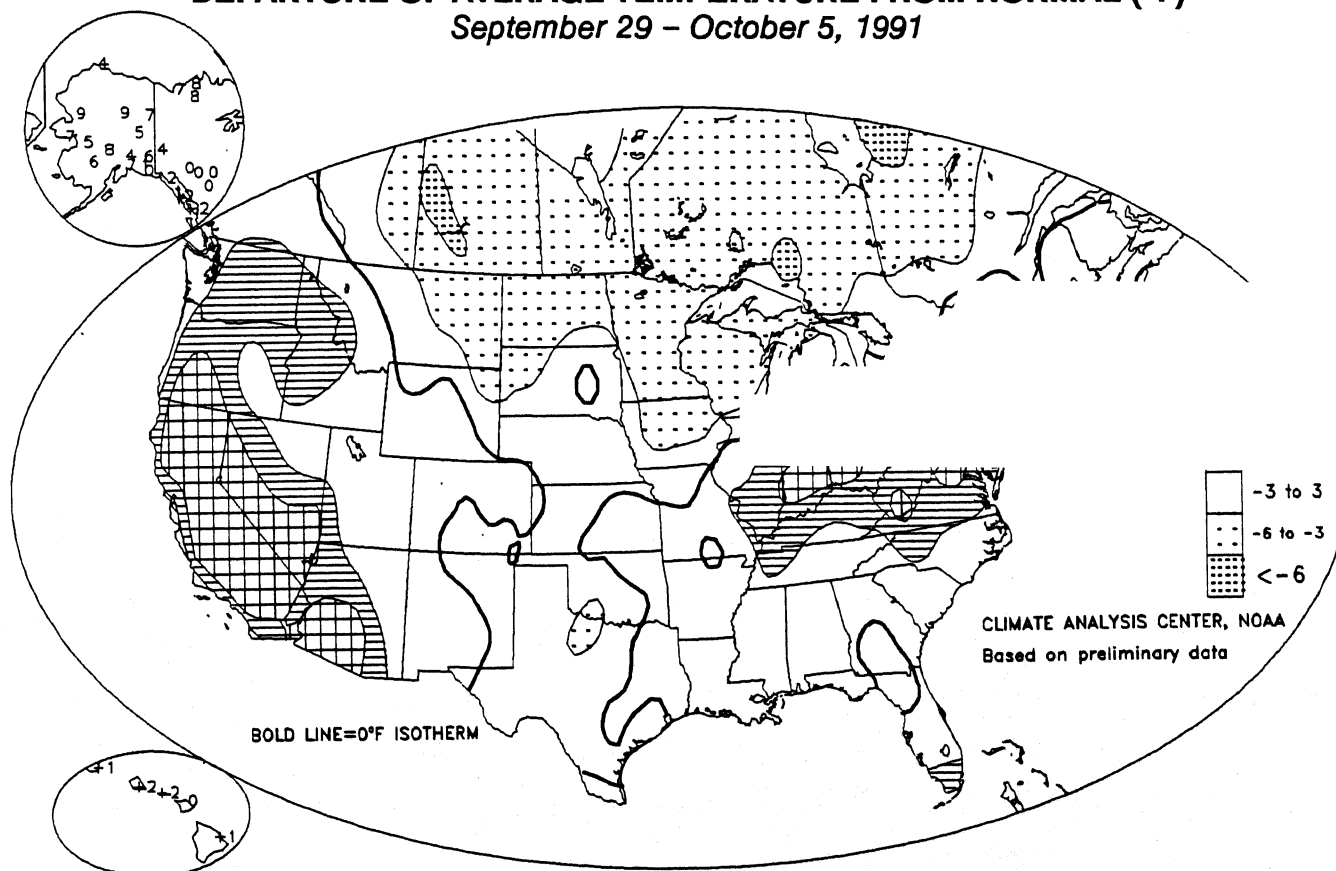
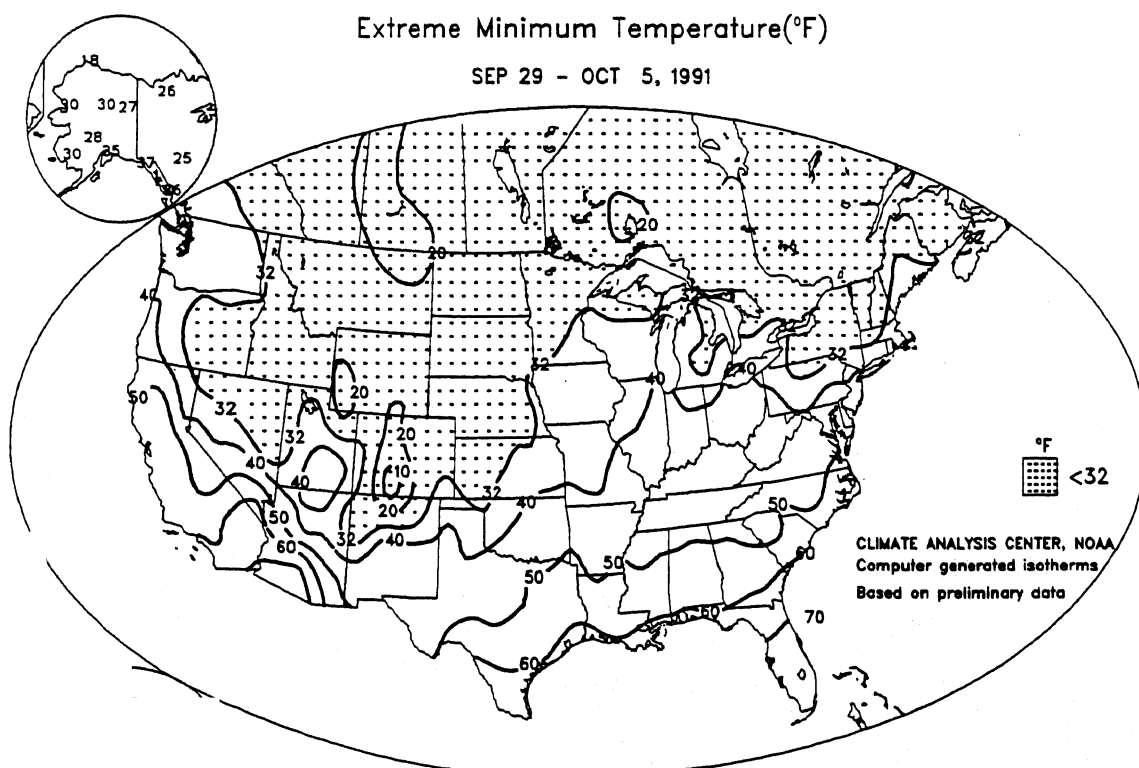


TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 8.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF SEPTEMBER 29 - OCTOBER 5, 1991

| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|-------------------------------|-------------------|-----------------|------------------------|-------------------|-----------------|
| SEXTON SUMMIT, OR | +13.6 | 68.9 | KOTZEBUE, AK | +9.1 | 40.7 |
| BLUE CANYON, CA | +12.9 | 71.5 | SACRAMENTO, CA | +9.0 | 77.1 |
| VICTORVILLE/GEORGE AFB, CA | +12.3 | 78.8 | PASO ROBLES, CA | +9.0 | 75.2 |
| SAN BERNARDINO/NORTON AFB, CA | +11.2 | 80.1 | DAGGETT, CA | +8.9 | 83.4 |
| FRESNO, CA | +11.1 | 80.7 | STOCKTON, CA | +8.9 | 77.7 |
| RENO, NV | +10.2 | 65.2 | BIG DELTA, AK | +8.8 | 43.0 |
| BETTLES, AK | +10.0 | 40.3 | MARYSVILLE/YUBA CO, CA | +8.7 | 77.9 |
| MT SHASTA, CA | +9.9 | 66.2 | UKIAH, CA | +8.7 | 74.5 |
| RED BLUFF, CA | +9.8 | 80.1 | MCGRATH, AK | +8.7 | 43.3 |
| PHOENIX, AZ | +9.5 | 88.7 | BURBANK/HOLLYWOOD, CA | +8.5 | 77.5 |
| MEDFORD, OR | +9.3 | 68.7 | YUMA, AZ | +8.2 | 90.1 |
| BAKERSFIELD, CA | +9.1 | 81.9 | | | |

TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 4.0°F OR MORE BELOW NORMAL FOR THE WEEK OF SEPTEMBER 29 - OCTOBER 5, 1991

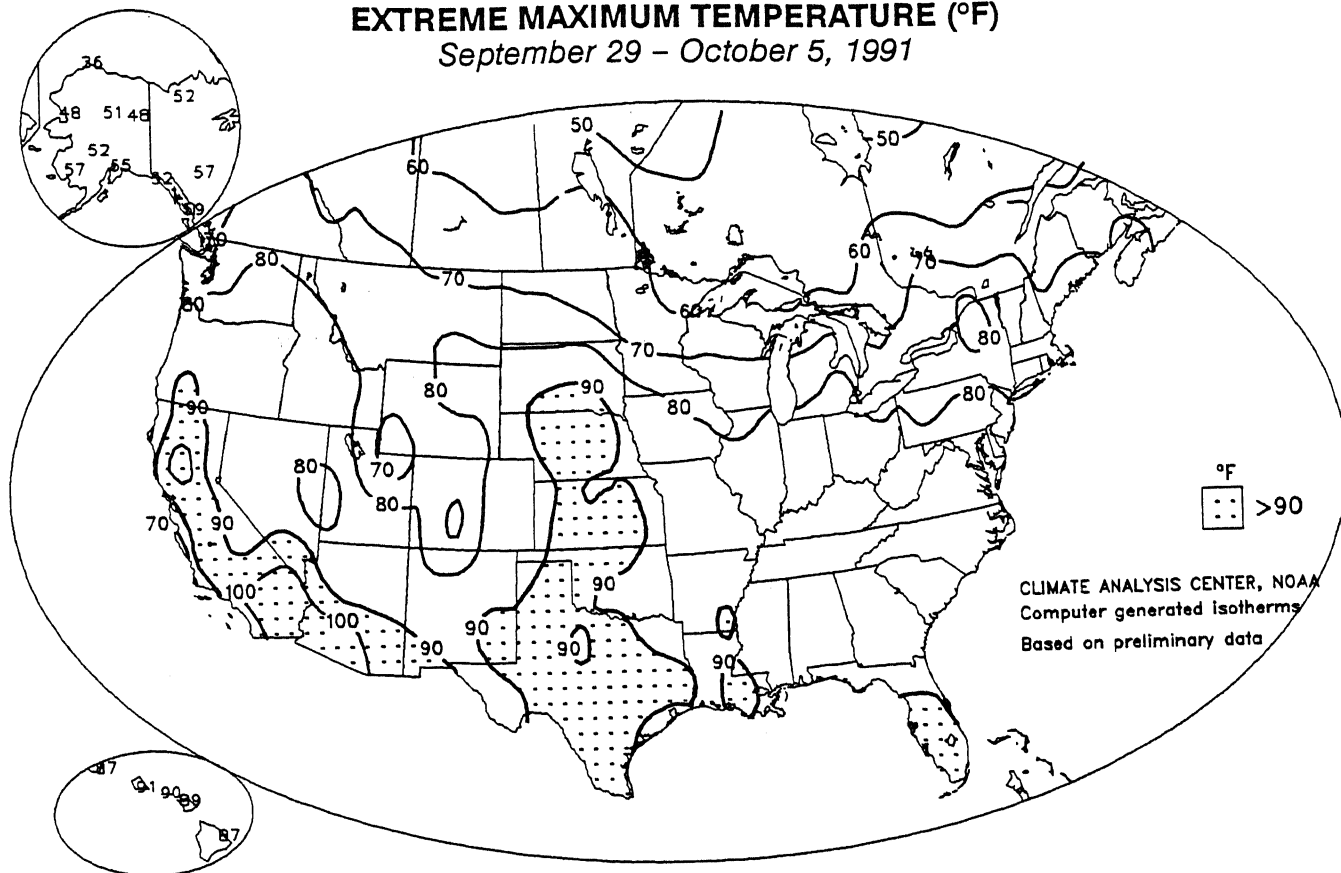
| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|------------------|-------------------|-----------------|-------------------------|-------------------|-----------------|
| WARROAD, MN] | -6.2 | 43.6 | PARK FALLS, WI | -4.8 | 46.2 |
| DICKINSON, ND | -6.1 | 45.4 | HANCOCK/HOUGHTON CO, MI | -4.5 | 45.3 |
| DEVIL'S LAKE, ND | -5.9 | 44.9 | WAUSAU, WI | -4.5 | 48.1 |
| WILLISTON, ND | -5.9 | 45.6 | ROCHESTER, MN | -4.5 | 49.6 |
| FT DODGE, IA | -5.8 | 51.7 | WATERLOO, IA | -4.4 | 52.0 |
| MARQUETTE, MI | -5.4 | 43.9 | TUCUMCARI, NM | -4.3 | 60.2 |
| GLASGOW, MT | -5.3 | 46.8 | INTERNATIONAL FALLS, MN | -4.1 | 44.1 |
| MINOT, ND | -5.1 | 46.0 | ESCENABA, MI | -4.1 | 48.1 |
| BISMARCK, ND | -4.9 | 46.9 | MILES CITY, MT | -4.0 | 50.2 |
| LA CROSSE, WI | -4.9 | 51.6 | MADISON, WI | -4.0 | 51.2 |



th as the higher elevations of Arizona and New Mexico. Subfreezing
s and northern Pennsylvania while temperatures failed to drop below
oast, and Florida.

EXTREME MAXIMUM TEMPERATURE (°F)

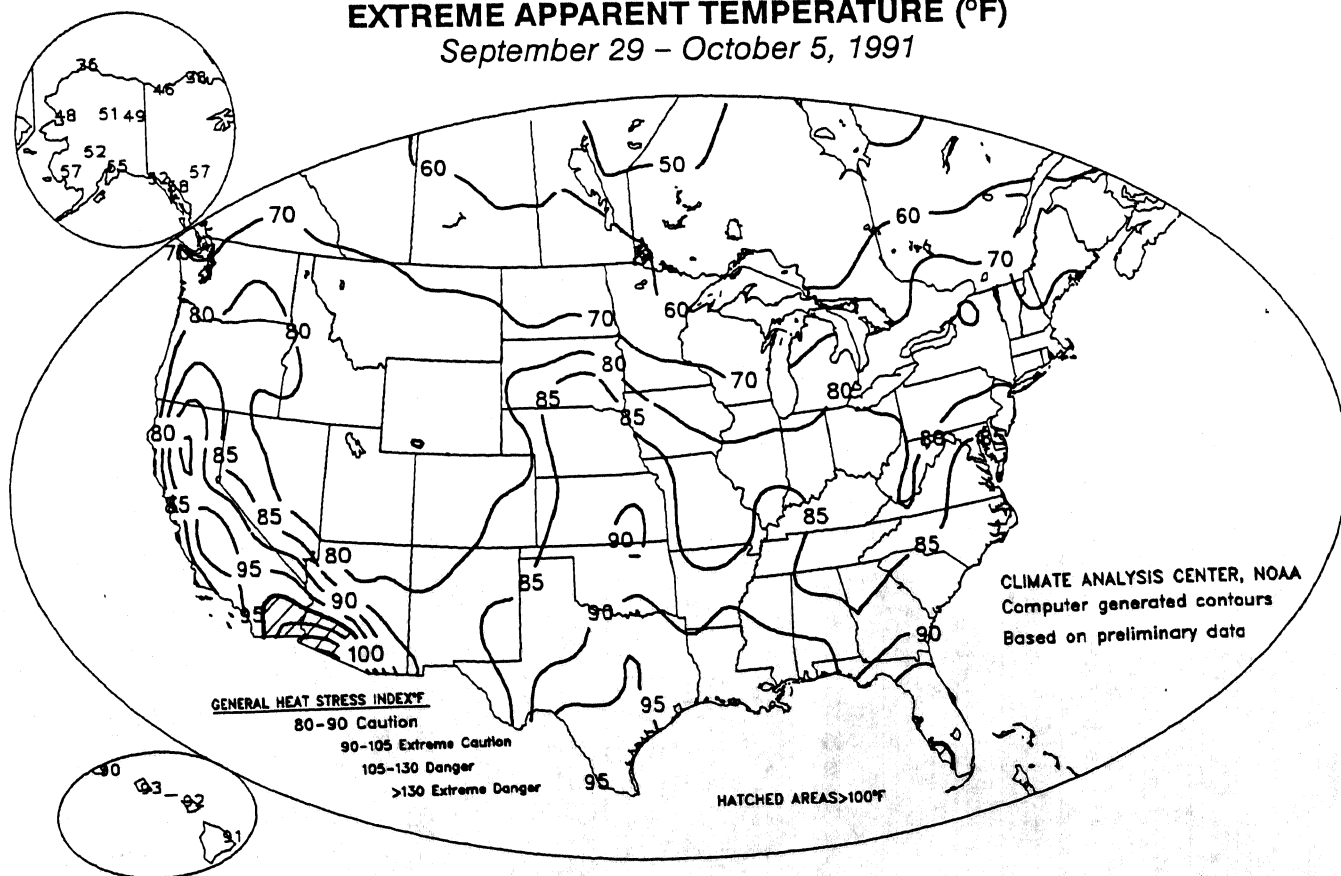
September 29 - October 5, 1991



Abnormally warm weather remained in the Far West and moved into the Great Plains as highs reached into the nineties as far north as southern Oregon and southern South Dakota (top). However, low humidities at most locations limited uncomfortable apparent temperatures ($>95^{\circ}\text{F}$) to Florida, southern Texas, and the desert Southwest (bottom).

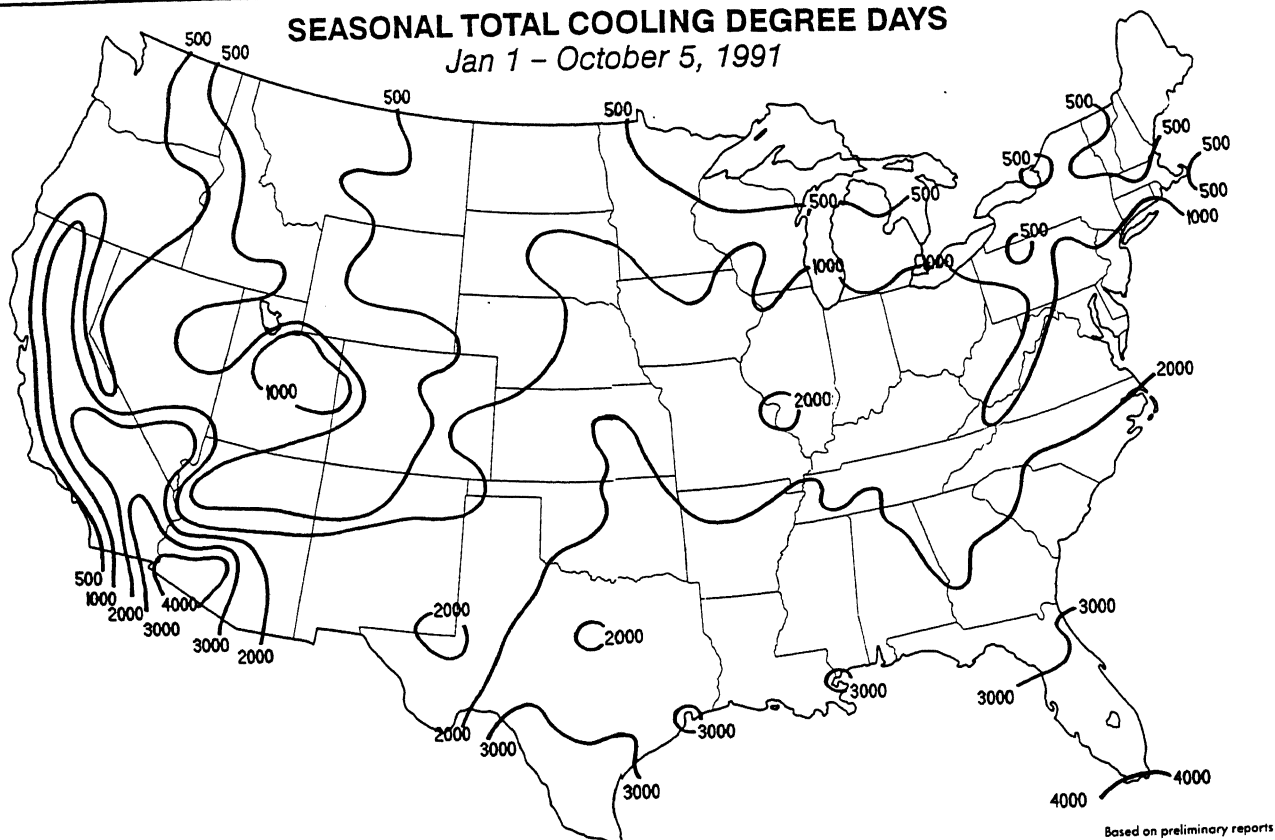
EXTREME APPARENT TEMPERATURE (°F)

September 29 - October 5, 1991



SEASONAL TOTAL COOLING DEGREE DAYS

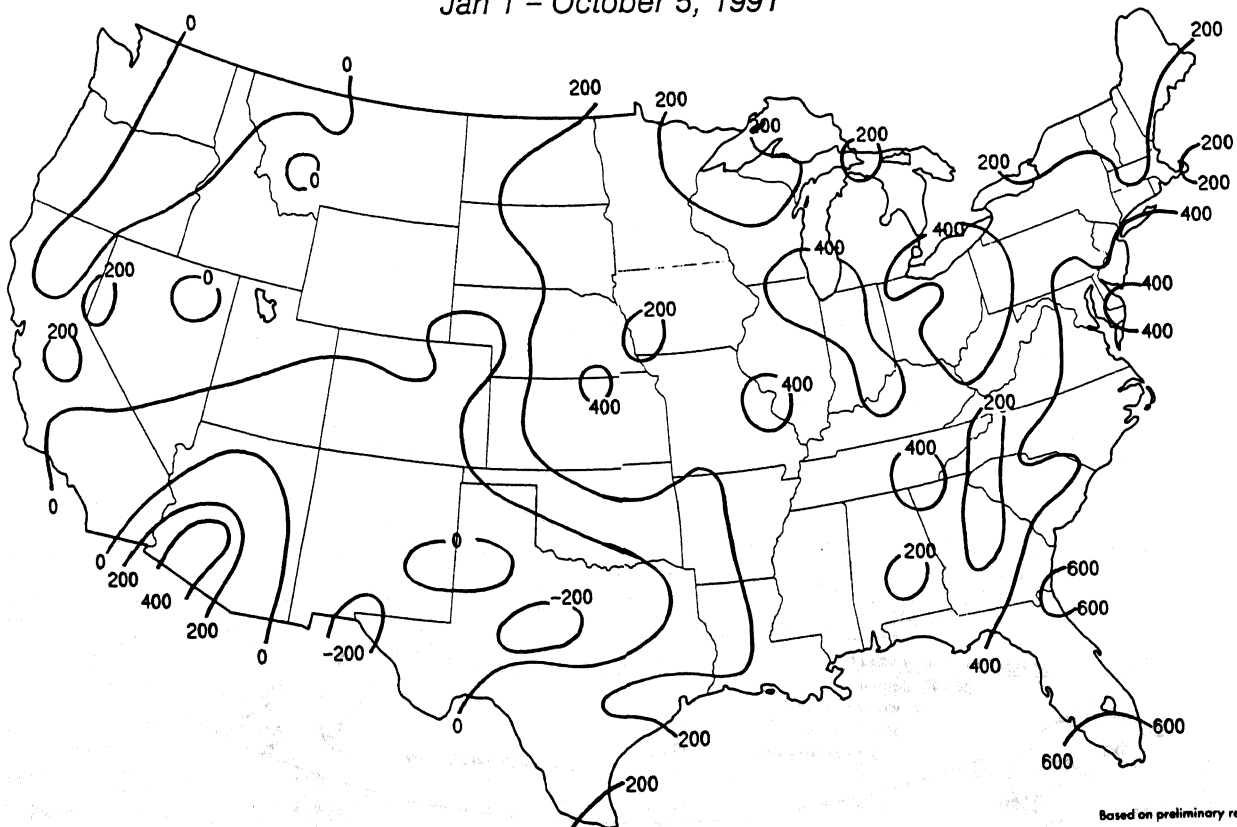
Jan 1 - October 5, 1991



Unseasonably warm weather since the beginning of the year has generated significant cooling usage (>2000 CDD's) in the southern tier of states (top). Abnormally warm conditions in the eastern U.S. have resulted in well above normal cooling demand (>400 CDD's) along the southern and mid-Atlantic coast, portions of the Ohio, Tennessee, and Mississippi Valleys, central Plains and desert Southwest (bottom).

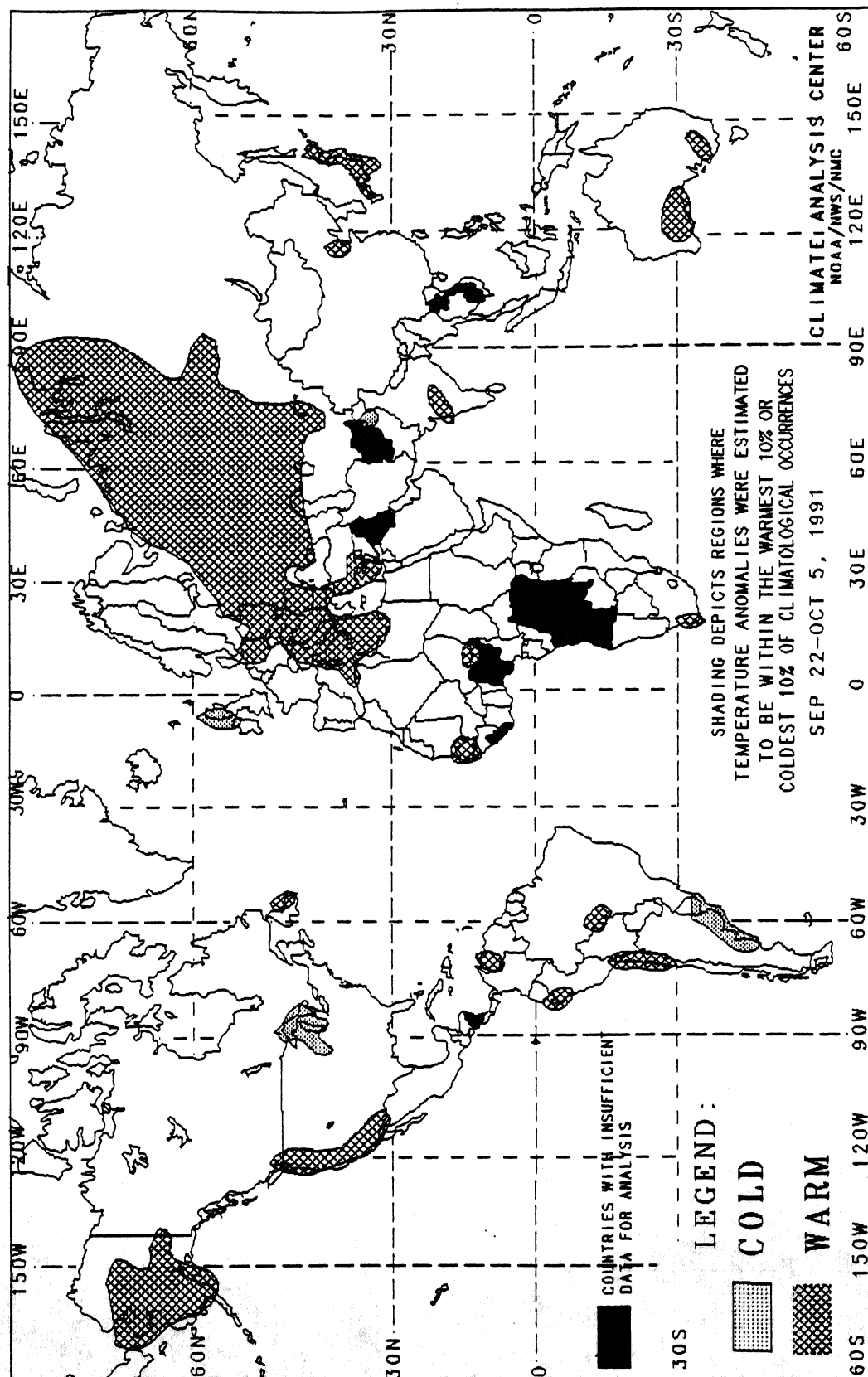
ACCUMULATED DEPARTURE FROM NORMAL CDD (SEASONAL)

Jan 1 - October 5, 1991



2-WEEK GLOBAL TEMPERATURE ANOMALIES

SEPTEMBER 22 - OCTOBER 5, 1991

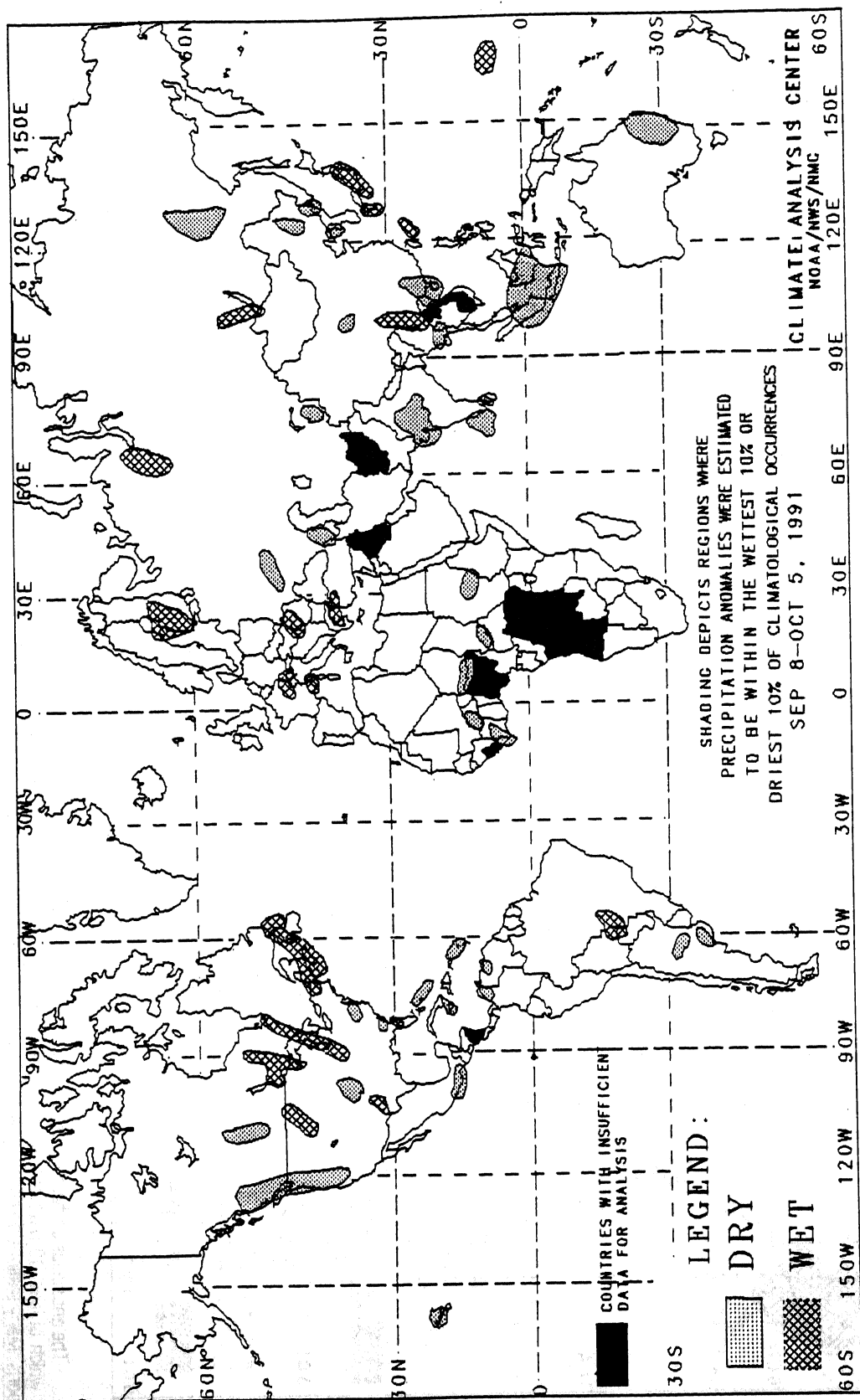


The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

Temperature anomalies are not depicted unless the magnitude of temperature

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.



In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

UNITED STATES MONTHLY CLIMATE SUMMARY

SEPTEMBER 1991

The transition from summer to autumn was marked abruptly in mid-September as a late-summer heat wave in the eastern third of the nation gave way to a strong blast of Canadian air. While record heat and severe weather swept through the East, record cold settled into the nation's midsection and early season snowfall blanketed parts of the Rockies and Midwest. The heat wave brought 130 daily record high temperatures while over a 100 record lows were set following the outbreak of Canadian air. Anomalous warmth persisted in the western quarter of the country, particularly during the latter half of the month, as temperatures averaged more than 4°F above normal in the interior portions of the Pacific Coast states (Figure 4). Temperatures topped the century mark in northern California near the end of September. Abnormally heavy showers drenched portions of the Great Basin, southern Plains, upper Mississippi Valley, and New England, resulting in severe flooding in northern Utah and along the Rio Grande River. In contrast, dry weather again prevailed from the central Plains to the central Appalachians and mid-Atlantic as parts of this region received less than half of normal precipitation (Figure 2). In addition, heavy rains soaked southeastern Alaska and eastern Hawaii while dry conditions prevailed in northeastern Alaska and western Hawaii.

Mid-summerlike weather marked the first half of September as abnormally hot air spread across the eastern two-thirds of the nation. The unusually warm conditions along with high humidities produced triple digit apparent temperatures over the southern Plains and Deep South northward into the Ohio Valley. Numerous record daily highs were established while Philadelphia, PA set a new record for the number of 90°F (or greater) days in a season. In the West, sharply colder air replaced early-month heat. Lows dipped below freezing as far south as Colorado, and the first widespread snow of the season blanketed parts of Wyoming. Meanwhile, strong thunderstorms battered portions of the eastern Great Basin, central and southern Rockies, southern Plains, and upper Midwest. Heavy rain in northern Utah generated severe flooding. A 24-hour state rainfall record was established at North Ogden when 8.4 inches fell during September 7-8. Copious rains also generated flooding in parts of Minnesota, Oklahoma, and Texas.

A strong cold front trekked across the eastern two-thirds of the country around mid-month as cool air replaced the anomalous warmth. Over six dozen record daily highs were established from the Southeast to northern New England, with some locations reporting the highest temperature ever so late in the year. In sharp contrast, numerous locations in Indiana and Illinois recorded the lowest readings for so early in autumn as sub-freezing temperatures were common across the upper Midwest and Great Lakes. Elsewhere, intense thunderstorms saturated the southern Plains with heavy rain, aggravating some of the worst flooding since 1978 along the Rio Grande River. Thunderstorms also dumped heavy rain across New England while warm and dry conditions dominated the Far West. The dry heat established ideal wildfire conditions as 1200 acres were scorched in California's Shasta-Trinity National Forest.

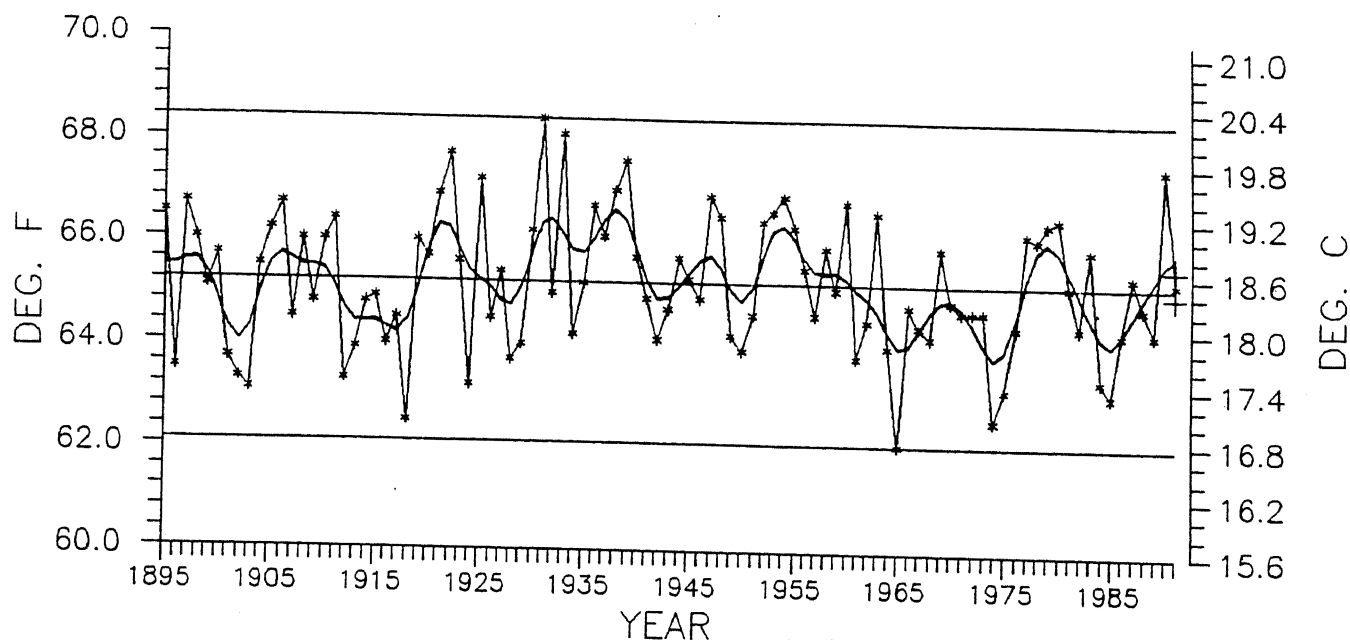
According to the River Forecast Centers, the greatest monthly precipitation totals (more than 6 inches) were reported over much of the southern Plains, western Gulf coast, the Florida peninsula, New England, southeastern Alaska, and eastern Hawaii (Table 1). Isolated locations across the southern half of Texas and across the Florida keys measured up to 15.9 inches while 8-12 inches drenched a large swath from east-central Oklahoma westward into northeastern Texas. Scattered heavy amounts also fell across the Mississippi Valley, Southeast, and Northeast. Above normal precipitation prevailed over much of the Rockies, Great Basin, desert Southwest, northern and southern Plains, upper and lower Mississippi Valley, Northeast and portions of the Great Lakes, upper Ohio Valley, and Southeast (Figure 2). Exceptionally heavy rains inundated southern Alaska as over 43 inches bombed Yakutat. According to the National Climatic Data Center, 1991 brought the South and West regions the 23rd and 28th wettest September, respectively, since 1895.

Abnormally dry conditions (less than 75 % of normal) covered much of the central Plains, middle Mississippi Valley, mid-Atlantic, and Southeast (page 13). Some areas were extremely dry, receiving well below half of normal September rainfall. Seasonably dry weather persisted over southern sections of the Far West while the Pacific Northwest experienced near-record dryness following heavy late-August rains. Regionally, the Northwest, Southeast, and Central had their 3rd, 24th, and 29th driest September on record, respectively (page 11). Nationally, September 1991 ranked as the 38th driest September on record (page 10). For the first nine months of the year, four states (PA, OH, MD, and IN) recorded one of the ten driest January-September periods since 1895 (page 18).

Although September temperatures averaged near normal nationally (page 10), there was considerable variability with respect to time and location. Warm weather persisted in the Far West (page 14, Figure 4) as only the second week of the month brought below normal temperatures. September departures also exceeded +2°F in portions of the northern and central Plains, northern Rockies, and central and western Alaska. Regionally, the West and Northwest had the 5th and 11th warmest September on record (page 11). For the nation as a whole, the year so far has been unusually warm, with the January-September period ranking as the 7th warmest such period. Not surprisingly, twenty eight states reported one of the ten warmest January-September periods this year (page 17). Going back to January 1990, the last 21 months have been the fourth mildest such period on record, following the unprecedented cold outbreak of December 1989 east of the Rockies.

Subnormal September temperatures (more than 2°F below normal) were limited to the southern Rockies, southern Plains, and portions of the Northeast (Table 4). A number of stations in the eastern half of the nation, however, set new September low temperature records following the cold outbreak at mid-month (Table 7). Regionally, the South, East North Central, and Northeast ranked in the lower third of the historical September temperature distribution.

U.S. NATIONAL TEMPERATURE SEPTEMBER, 1895-1991



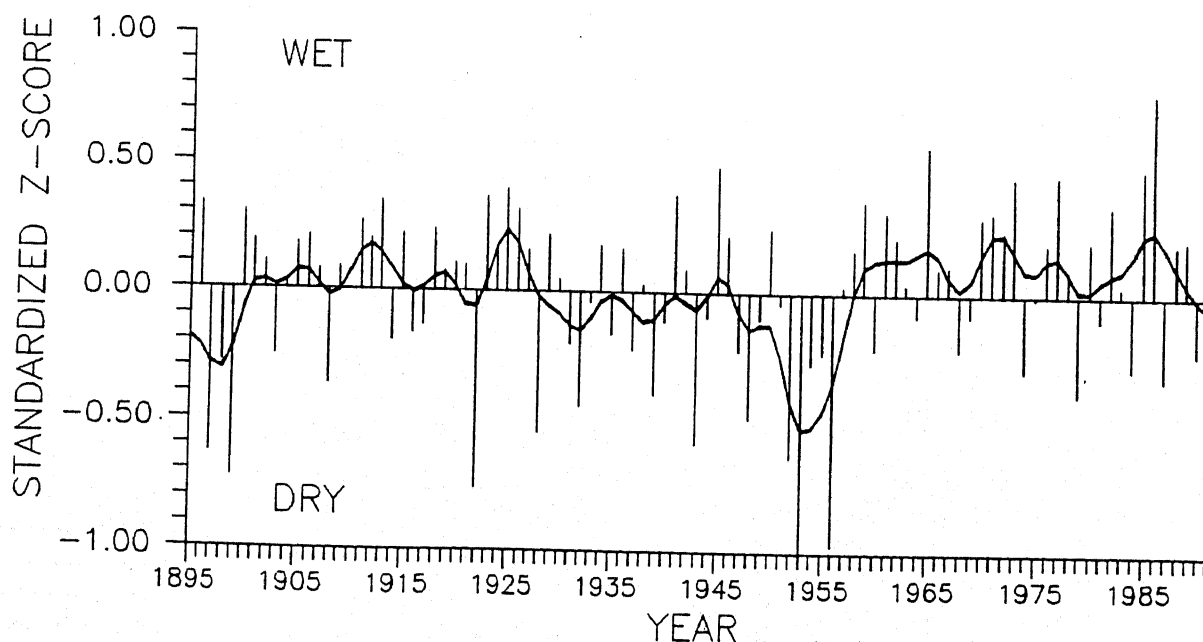
National Climatic Data Center, NOAA

STRAIGHT HORIZONTAL LINES ARE:
MAXIMUM VALUE (TOP),
LONG-TERM AVERAGE (MIDDLE),
MINIMUM VALUE (BOTTOM)

CONFIDENCE INTERVAL
FOR CURRENT YEAR IS
INDICATED BY '+'.
The 1991 value is based on preliminary data, which has been shown to be within 0.26°F of the final data over a 31-month period.

Nationally Averaged September Temperatures, As Computed by the National Climatic Data Center. September, 1991 for the nation as a whole, averaged just above the long-term mean (46th warmest). The 1991 value is based on preliminary data, which has been shown to be within 0.26°F of the final data over a 31-month period.

U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX SEPTEMBER, 1895-1991



National Climatic Data Center, NOAA

National Mean September Precipitation Index, 1895-1991, As computed by the National Climatic Data Center. September 1991 ranked as 38th driest September on record. This index takes local normals into account so that typically wet regions do not dominate the index value.

**TEMPERATURE AND PRECIPITATION RANKINGS FOR
SEPTEMBER 1991, BASED ON THE PERIOD 1895 TO 1991.
1 = DRIEST/COLDEST AND 97 = WETTEST/HOTTEST.**

| <u>REGION</u> | <u>PRECIPITATION</u> | <u>TEMPERATURE</u> |
|--------------------|----------------------|--------------------|
| NORTHEAST | 64 | 24 |
| EAST NORTH CENTRAL | 55 | 23 |
| CENTRAL | 29 | 49 |
| SOUTHEAST | 24 | 51 |
| WEST NORTH CENTRAL | 53 | 69 |
| SOUTH | 75 | 19 |
| SOUTHWEST | 83 | 49 |
| NORTHWEST | 3 | 87 |
| WEST | 70 | 93 |
| NATIONAL | 38 | 52 |

National Climatic Data Center

THE 9 U.S. REGIONAL BOUNDARIES AS DEFINED BY THE NATIONAL CLIMATIC DATA CENTER (NCDC) AND REGULARLY USED IN THE MONTHLY AND SEASONAL U.S. CLIMATE SUMMARIES.

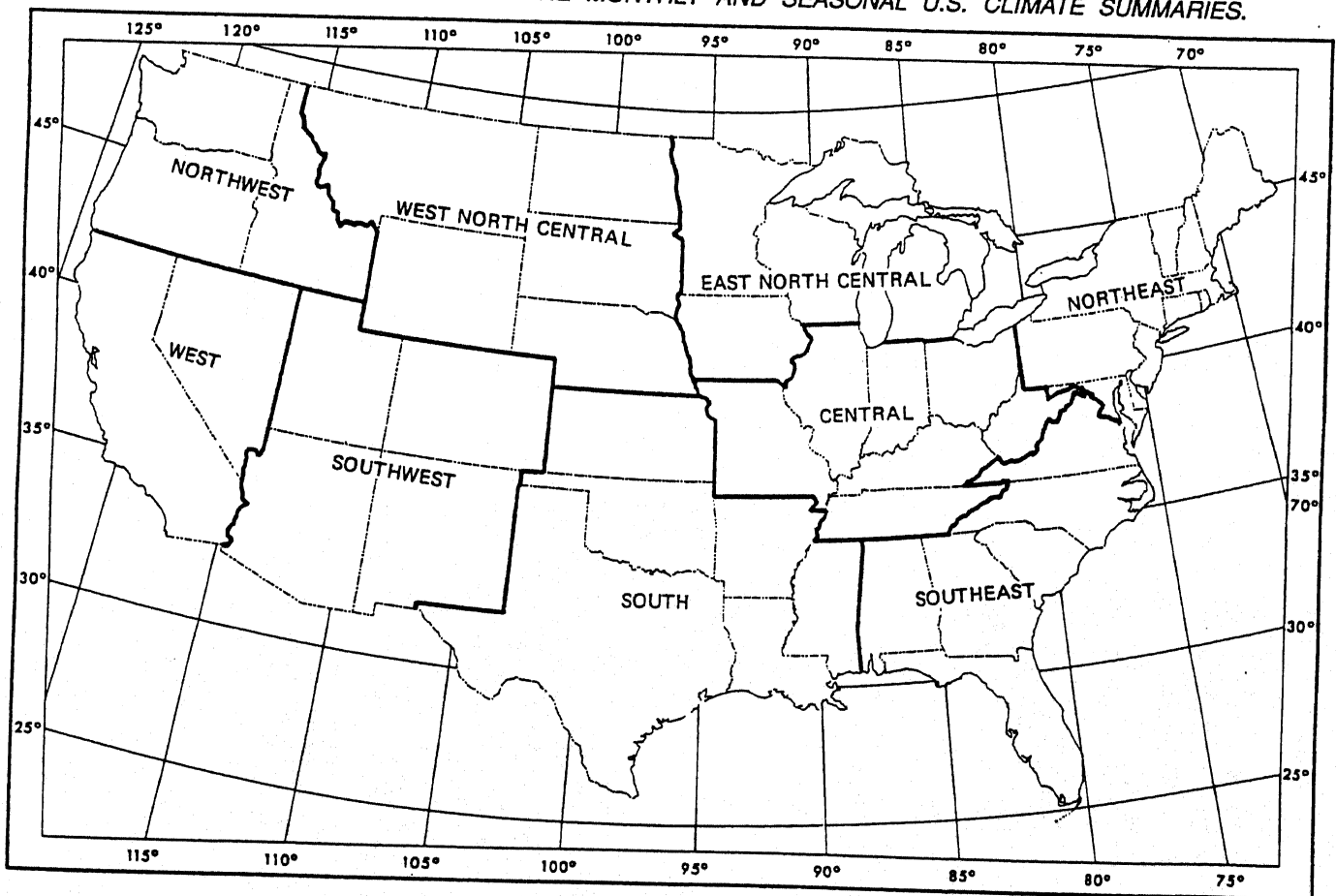


TABLE 1. SELECTED STATIONS WITH 150% OR MORE OF THE NORMAL PRECIPITATION AND 5.50 INCHES OR MORE PRECIPITATION; OR, STATIONS WITH 8.50 INCHES OR MORE PRECIPITATION AND NO NORMALS DURING SEPTEMBER 1991.

| <u>STATION</u> | <u>TOTAL</u> <u>(INCHES)</u> | <u>PCT. OF</u> <u>NORMAL</u> | <u>STATION</u> | <u>TOTAL</u> <u>(INCHES)</u> | <u>PCT. OF</u> <u>NORMAL</u> |
|----------------------------|---------------------------------|---------------------------------|---------------------------|---------------------------------|---------------------------------|
| YAKUTAT, AK | 43.16 | 273.5 | DEL RIO, TX | 6.89 | 252.4 |
| CORDOVA/MILE 13, AK | 19.05 | 150.1 | LUBBOCK, TX | 6.78 | 332.4 |
| SITKA, AK | 17.62 | 160.8 | CARLSBAD, NM | 6.68 | 309.3 |
| JUNEAU, AK | 14.96 | 234.5 | MONROE, LA | 6.44 | 184.5 |
| OKLAHOMA CITY, OK | 11.86 | 344.8 | CHICOPEE/WESTOVER AFB, MA | 6.35 | 171.6 |
| PALACIOS, TX | 11.40 | 158.8 | BOSTON/LOGAN, MA | 6.32 | 186.4 |
| KODIAK, AK | 9.99 | 158.6 | MERIDIAN, MS | 6.04 | 169.2 |
| KEY WEST NAS, FL | 9.77 | *** | ABILENE, TX | 5.99 | 195.8 |
| FT SILL/HENRY POST AAF, OK | 9.47 | 309.5 | KINGSVILLE NAS, TX | 5.98 | 164.3 |
| JACKSONVILLE NAS, FL | 9.39 | *** | TEXARKANA, AR | 5.87 | 164.4 |
| DULUTH, MN | 9.38 | 290.4 | SAULT STE MARIE, MI | 5.85 | 150.8 |
| HOMESTEAD AFB, MS | 8.81 | *** | COLD BAY, AK | 5.84 | 153.7 |
| MCCOMB, MS | 8.50 | *** | CONCORD, NH | 5.52 | 176.9 |
| HOUSTON/WILLIAM HOBBY, TX | 8.50 | *** | CHARLESTON, WV | 5.52 | 184.0 |
| WICHITA FALLS, TX | 8.28 | 244.2 | | | |

NOTE: Stations without precipitation normals are indicated by asterisks.

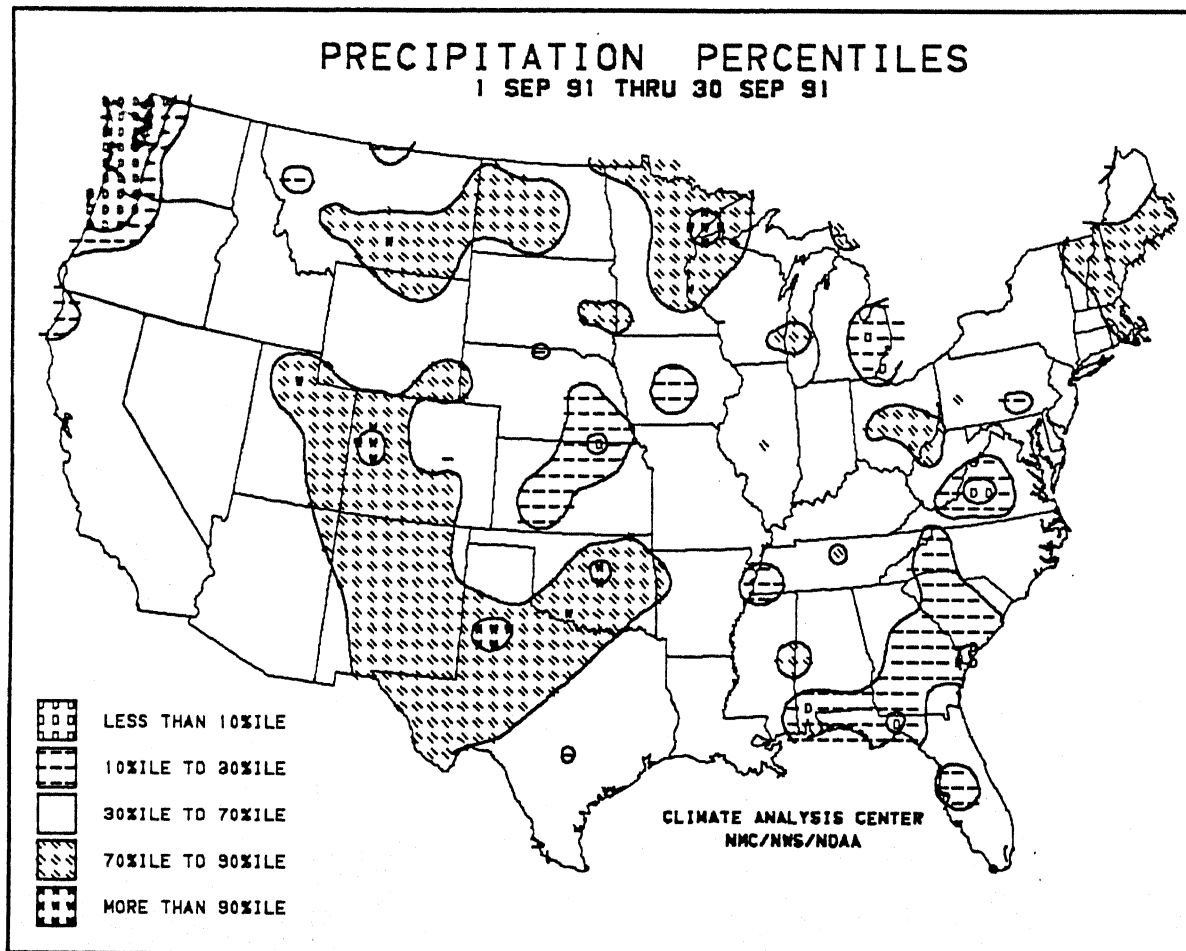


FIGURE 1. September 1991 Precipitation Percentiles. Significant September dryness [$<30\%$ ile] was observed in portions of the Southeast, mid-Atlantic, middle Mississippi Valley, eastern Great Lakes, central Great Plains, and Pacific Northwest. Exceptionally low precipitation totals [$<10\%$ ile] were measured in the Pacific Northwest and southeastern Virginia. In contrast, normally wet weather [$>70\%$ ile] affected the southern Plains, Rockies, Ohio Valley, and New England.

TABLE 2. SELECTED STATIONS WITH 35% OR LESS OF THE NORMAL PRECIPITATION AND NORMAL PRECIPITATION OF 3.00 INCHES OR MORE DURING SEPTEMBER 1991.

| STATION | TOTAL (INCHES) | PCT. OF NORMAL | NORMAL (INCHES) | STATION | TOTAL (INCHES) | PCT. OF NORMAL | NORMAL (INCHES) |
|----------------------|-------------------|-------------------|--------------------|--------------------------|-------------------|-------------------|--------------------|
| ASTORIA, OR | 0.07 | 2.2 | 3.18 | MACON, GA | 0.68 | 20.7 | 3.29 |
| RUSSELL, KS | 0.12 | 3.8 | 3.12 | ENID/VANCE AFB, OK | 0.89 | 28.9 | 3.08 |
| QUILLAYUTE, WA | 0.12 | 2.0 | 6.15 | DES MOINES, IA | 0.90 | 29.3 | 3.07 |
| MACON/WARNER AFB, GA | 0.13 | 3.6 | 3.57 | SALINA, KS | 0.93 | 26.5 | 3.51 |
| ROANOKE, VA | 0.15 | 4.8 | 3.11 | VALPARAISO/EGLIN AFB, FL | 1.15 | 16.6 | 6.92 |
| CONCORDIA, KS | 0.21 | 7.0 | 3.00 | ASHEVILLE, NC | 1.24 | 32.7 | 3.79 |
| LYNCHBURG, VA | 0.22 | 6.8 | 3.22 | PENSACOLA, FL | 1.38 | 20.5 | 6.74 |
| STAMPEDE PASS, WA | 0.26 | 5.6 | 4.65 | GREENVILLE, SC | 1.44 | 31.0 | 4.64 |
| WAYCROSS, GA | 0.27 | 5.9 | 4.57 | APALACHICOLA, FL | 1.81 | 20.9 | 8.66 |
| SAVANNAH, GA | 0.35 | 6.7 | 5.19 | MOBILE, AL | 1.87 | 28.6 | 6.54 |
| TALLAHASSEE, FL | 0.56 | 8.7 | 6.43 | BRUNSWICK, GA | 2.02 | 26.6 | 7.60 |

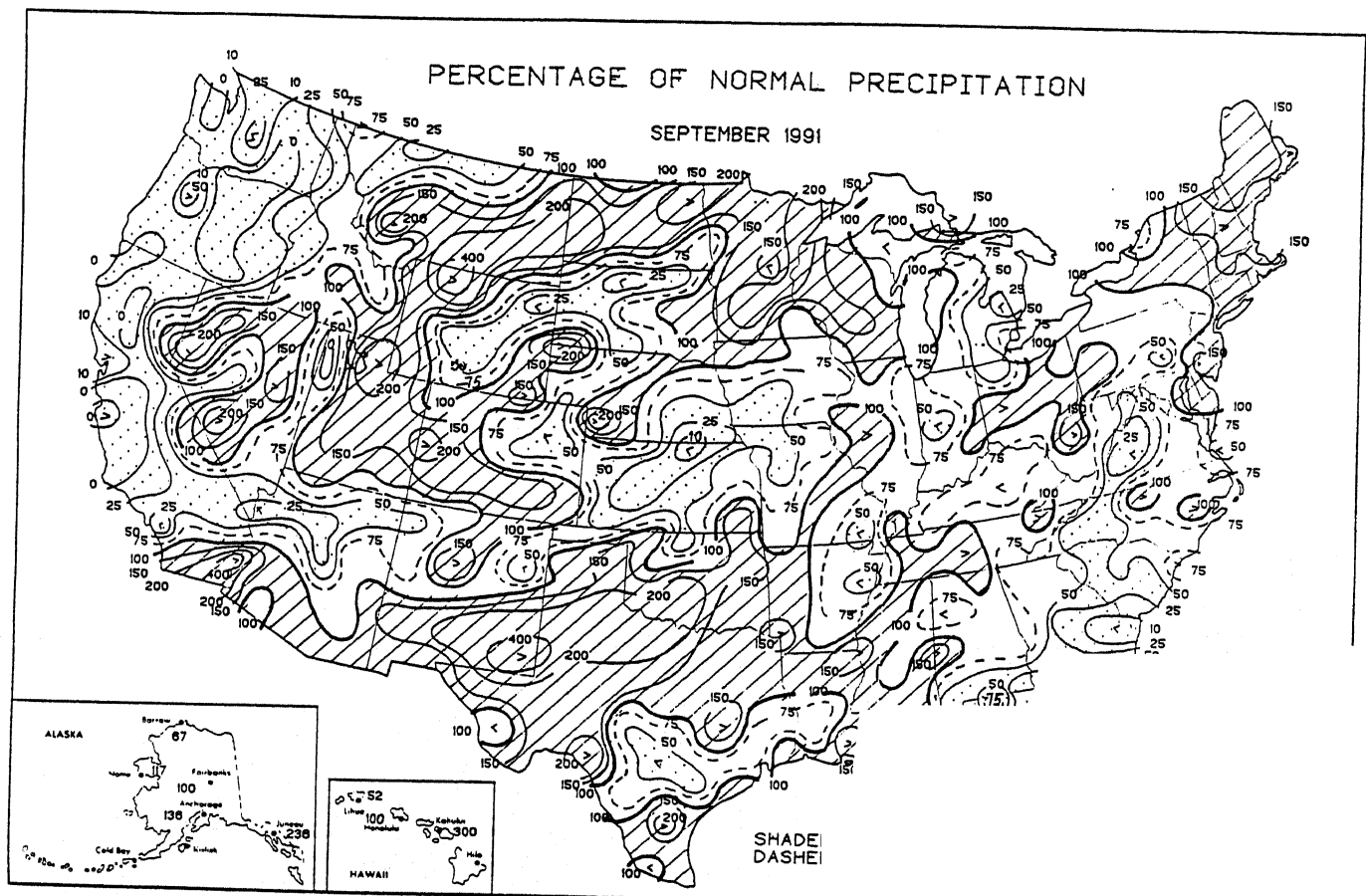


FIGURE 2. September 1991 Percent of Normal Precipitation and 400 percent. Precipitation was abnormally heavy across much of the southern United States, particularly along the Rio Grande River. Very high totals were also reported in the northern Plains, upper Mississippi Valley, and New England. Dry conditions, however, were reported in the central Great Plains, middle Mississippi Valley, Southeast, and mid-Atlantic, where

TABLE 3. SEPTEMBER 1991 AVERAGE TEMPERATURE 3.5°F OR MORE ABOVE NORMAL.

| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|----------------------------|-------------------|-----------------|-------------------|-------------------|-----------------|
| SEXTON SUMMIT, OR | +6.3 | 65.9 | STAMPEDE PASS, WA | +4.4 | 55.5 |
| VICTORVILLE/GEORGE AFB, CA | +6.2 | 77.9 | KOTZEBUE, AK | +4.3 | 45.8 |
| NOME, AK | +5.9 | 48.1 | RED BLUFF, CA | +4.2 | 79.4 |
| FRESNO, CA | +5.8 | 79.9 | WENATCHEE, WA | +4.1 | 67.8 |
| BLUE CANYON, CA | +5.7 | 68.5 | PHOENIX, AZ | +4.0 | 88.5 |
| MEDFORD, OR | +5.6 | 70.7 | KING SALMON, AK | +4.0 | 51.2 |
| RENO, NV | +5.6 | 65.8 | BAKERSFIELD, CA | +3.9 | 81.3 |
| MT SHASTA, CA | +5.5 | 66.4 | SALEM, OR | +3.8 | 65.5 |
| MCGRATH, AK | +5.0 | 49.1 | WINNEMUCCA, NV | +3.8 | 63.3 |
| PORTLAND, OR | +4.9 | 67.5 | NORTHWAY, AK | +3.7 | 45.6 |
| BIG DELTA, AK | +4.9 | 48.9 | BETTLES, AK | +3.7 | 45.4 |
| SAN BERNARDINO/NORTON, CA | +4.8 | 77.7 | BURLEY, ID | +3.5 | 62.7 |
| BETHEL, AK | +4.6 | 49.6 | | | |

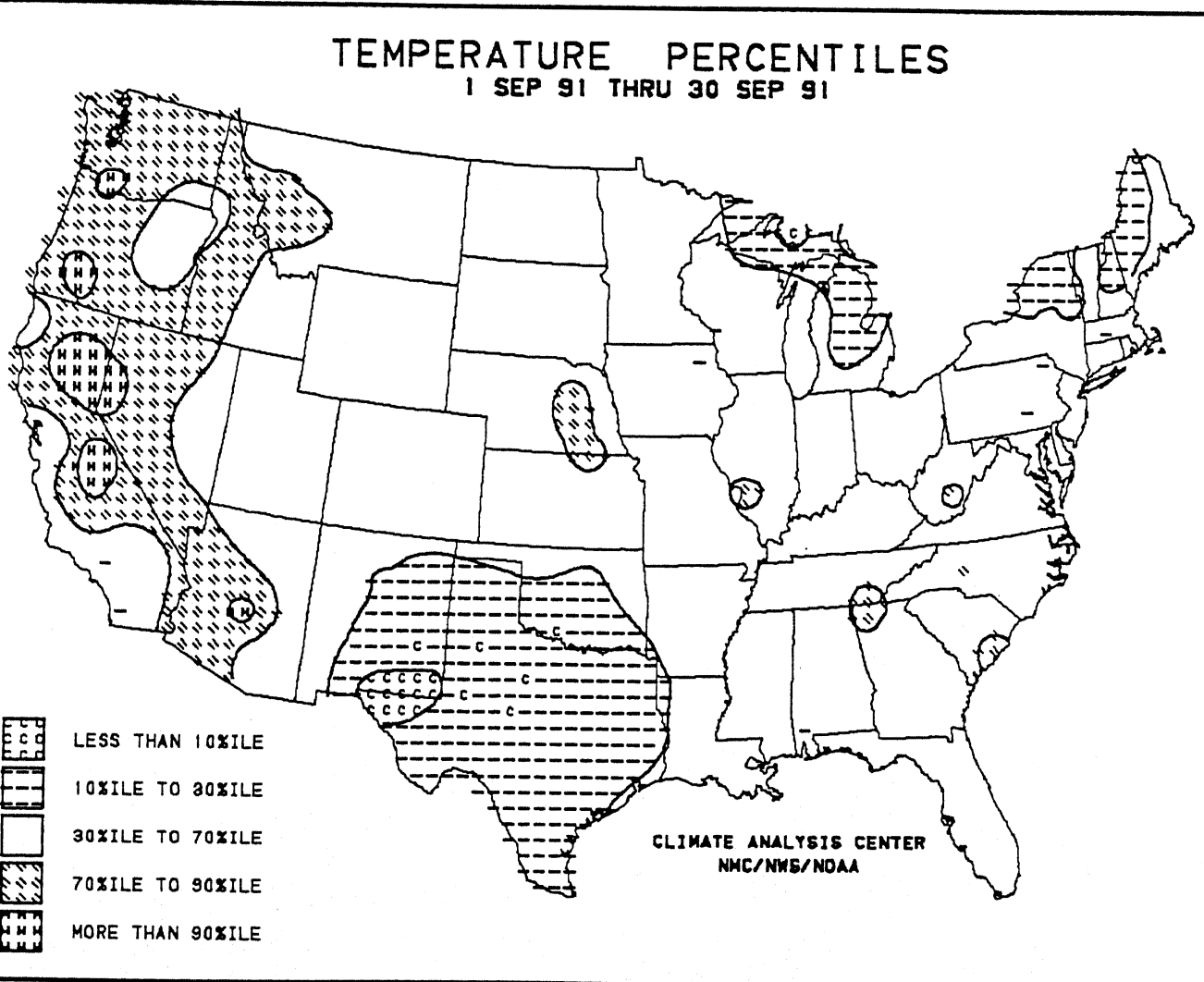


FIGURE 3. September 1991 Temperature Percentiles. *Significant warmth [$>70\%$ ile] was recorded over most of the Far West and portions of the central Great Plains, middle Mississippi Valley, and Southeast. In contrast, unusually cool conditions [$<30\%$ ile] covered much of the South-Central states, Great Lakes, and Northeast.*

TABLE 4. SEPTEMBER 1991 AVERAGE TEMPERATURE 2.5°F OR MORE BELOW NORMAL.

| <u>STATION</u> | <u>DEPARTURE</u> (°F) | <u>AVERAGE</u> (°F) | <u>STATION</u> | <u>DEPARTURE</u> (°F) | <u>AVERAGE</u> (°F) |
|----------------------------|--------------------------|------------------------|--------------------------|--------------------------|------------------------|
| TUCUMCARI, NM | -5.7 | 64.1 | LUBBOCK, TX | -3.2 | 68.0 |
| FT SILL/HENRY POST AAF, OK | -5.4 | 70.4 | ENID/VANCE AFB, OK | -3.1 | 71.0 |
| MEACHAM, OR | -4.9 | 51.0 | DEL RIO, TX | -3.1 | 77.1 |
| ABILENE, TX | -4.9 | 71.2 | MT WASHINGTON, NH | -3.0 | 37.6 |
| CARLSBAD, NM | -4.6 | 69.3 | ROSWELL, NM | -3.0 | 68.1 |
| WINK, TX | -4.6 | 71.0 | WARROAD, MN | -2.7 | 52.2 |
| MIDLAND, TX | -4.3 | 69.9 | LANSING, MI | -2.7 | 58.6 |
| SAN ANGELO, TX | -4.3 | 72.0 | DALLAS-FT WORTH, TX | -2.7 | 75.2 |
| WICHITA FALLS, TX | -4.3 | 72.0 | MASSENA, NY | -2.6 | 56.0 |
| EL PASO, TX | -4.1 | 70.7 | OKLAHOMA CITY, OK | -2.6 | 70.8 |
| CLOVIS/CANNON AFB, NM | -3.6 | 65.5 | ROME/GRIFFISS AFB, NY | -2.5 | 58.1 |
| HOBART, OK | -3.6 | 70.2 | MT CLEMENS/SELFRIDGE, MI | -2.5 | 60.7 |
| LAREDO, TX | -3.5 | 79.1 | AMARILLO, TX | -2.5 | 67.1 |
| JACKSON, MI | -3.4 | 59.4 | WACO, TX | -2.5 | 76.6 |
| DEMING, NM | -3.4 | 68.9 | | | |

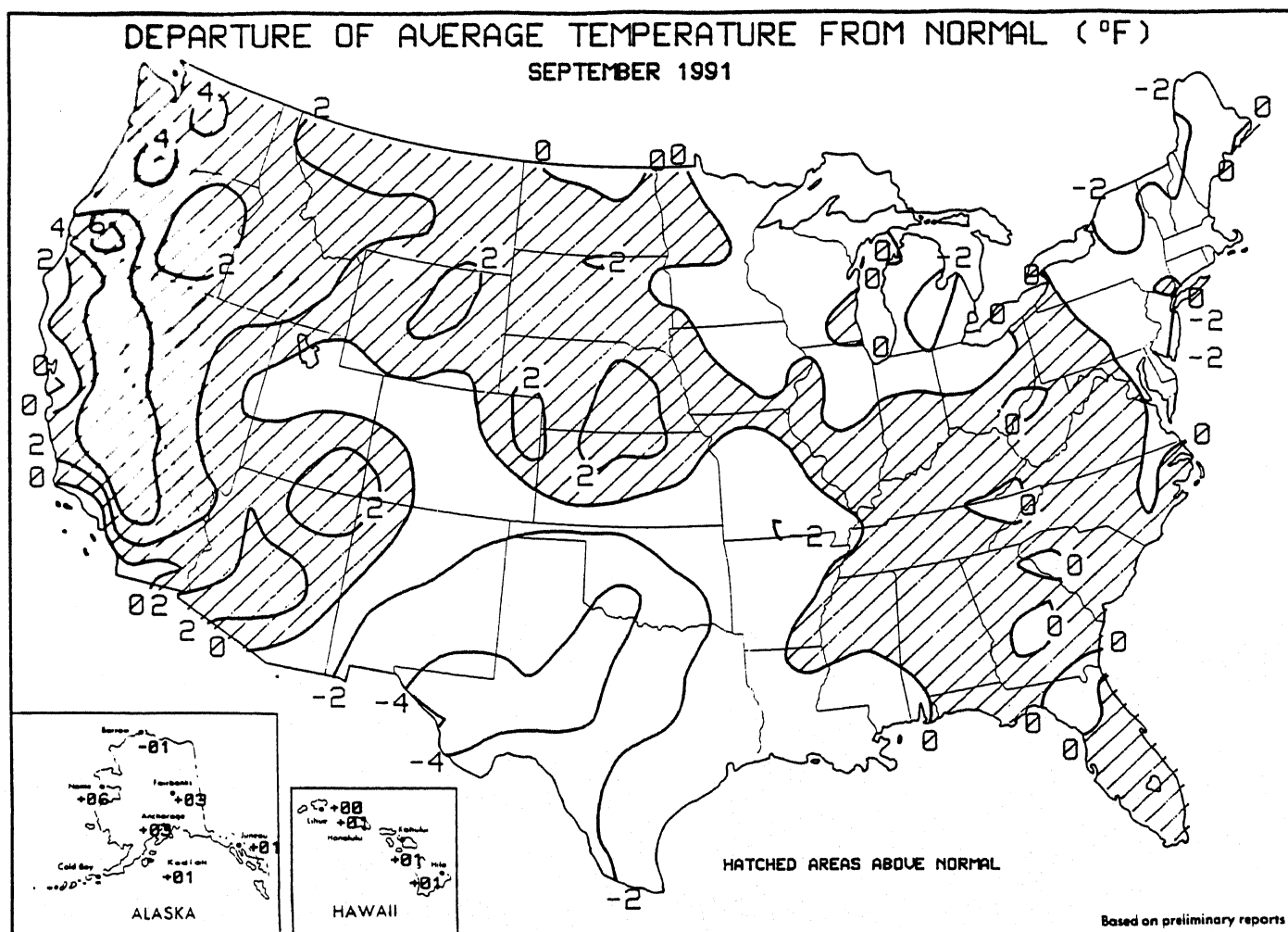


FIGURE 4. September 1991 Departure of Average Temperature from Normal (°F). *Isopleths drawn only for -4°F, -2°F, 0°F, 2°F, 4°F, and 6°F. Warmer than normal weather encompassed much of the nation from the Far West to the northern and central Great Plains, Southeast, lower Midwest, and mid-Atlantic. Temperatures were exceptionally high in the interior Pacific Coast States, where departures reached +6°F. Farther east, cooler than normal conditions affected the Northeast, Great Lakes, and South-Central States. Temperatures averaged less than -4°F below normal in parts of the southern Plains.*

TABLE 5. RECORD SEPTEMBER PRECIPITATION.

| <u>STATION</u> | <u>TOTAL</u> (INCHES) | <u>NORMAL</u> (INCHES) | <u>PCT. OF</u> <u>NORMAL</u> | <u>RECORD</u> <u>TYPE</u> | <u>RECORDS</u> <u>BEGAN</u> |
|--------------------|--------------------------|---------------------------|---------------------------------|------------------------------|--------------------------------|
| Juneau, AK | 14.96 | 6.38 | 234.5 | HIGHEST | 1944 |
| Oklahoma City, OK | 11.86 | 3.44 | 344.8 | HIGHEST | 1947 |
| Duluth, MN | 9.38 | 3.23 | 290.4 | HIGHEST | 1941 |
| Savannah, GA | 0.35 | 5.19 | 6.7 | LOWEST | 1951 |
| Concordia, KS | 0.21 | 3.00 | 7.0 | LOWEST | 1963 |
| Roanoke, VA | 0.15 | 3.11 | 4.8 | LOWEST | 1947 |
| Quillayute, WA | 0.12 | 6.15 | 2.0 | LOWEST | 1966 |
| Olympia, WA | 0.00 | 2.00 | 0 | LOWEST | 1944 |
| Seattle-Tacoma, WA | 0.00 | 2.00 | 0 | LOWEST | 1878 |
| Sexton Summit, OR | 0.00 | 1.31 | 0 | LOWEST | 1951 |
| Redding, CA | 0.00 | 1.05 | 0 | LOWEST | 1951 |
| Walla Walla, WA | 0.00 | 0.88 | 0 | LOWEST | 1940 |
| Medford, OR | 0.00 | 0.73 | 0 | LOWEST | 1947 |
| Pendleton, OR | 0.00 | 0.57 | 0 | LOWEST | 1947 |
| Red Bluff, CA | 0.00 | 0.44 | 0 | LOWEST | 1878 |
| Santa Maria, CA | 0.00 | 0.26 | 0 | LOWEST | 1947 |

NOTE: Trace precipitation is considered ZERO precipitation. Stations with no precipitation are only included if normal precipitation is 0.25 inches or more.

TABLE 6. RECORD SEPTEMBER AVERAGE TEMPERATURES.

| <u>STATION</u> | <u>AVERAGE</u> (°F) | <u>NORMAL</u> (°F) | <u>DEPARTURE</u> (°F) | <u>RECORD</u> <u>TYPE</u> | <u>RECORDS</u> <u>BEGAN</u> |
|----------------|------------------------|-----------------------|--------------------------|------------------------------|--------------------------------|
| Reno, NV | 65.8 | 60.3 | +5.6 | HIGHEST | 1947 |
| Portland, OR | 67.5 | 62.6 | +4.9 | HIGHEST | 1878 |
| Red Bluff, CA | 79.4 | 75.2 | +4.2 | HIGHEST | 1873 |

TABLE 7. RECORD SEPTEMBER EXTREME TEMPERATURES.

| <u>STATION</u> | <u>EXTREME</u> (°F) | <u>DATE</u> | <u>RECORD</u> <u>TYPE</u> | <u>RECORDS</u> <u>BEGAN</u> |
|------------------|------------------------|-------------|------------------------------|--------------------------------|
| Tallahassee, FL | 99 | Sep 13 | HIGHEST | 1940 |
| Tampa, FL | 96 | Sep 7 | HIGHEST | 1941 |
| Asheville, NC | 92 | Sep 15 | HIGHEST | 1965 |
| Kansas City, MO | 33 | Sep 19 | LOWEST | 1972 |
| Buffalo, NY | 32 | Sep 30 | LOWEST | 1943 |
| Youngstown, OH | 29 | Sep 28 | LOWEST | 1943 |
| Syracuse, NY | 28 | Sep 30 | LOWEST | 1950 |
| Grand Rapids, MI | 27 | Sep 28 | LOWEST | 1964 |
| Muskegon, MI | 27 | Sep 28 | LOWEST | 1940 |
| Flint, MI | 26 | Sep 28 | LOWEST | 1942 |
| Norfolk, NE | 26 | Sep 19 | LOWEST | 1946 |
| Marquette, MI | 24 | Sep 28 | LOWEST | 1979 |
| Lansing, MI | 22 | Sep 28 | LOWEST | 1949 |
| Valentine, NE | 17 | Sep 19 | LOWEST | 1949 |

TEMPERATURE RANKINGS FOR JAN-SEP 1991, BASED ON THE PERIOD 1895 TO 1991. 1 = COLDEST AND 97 = WARMEST.

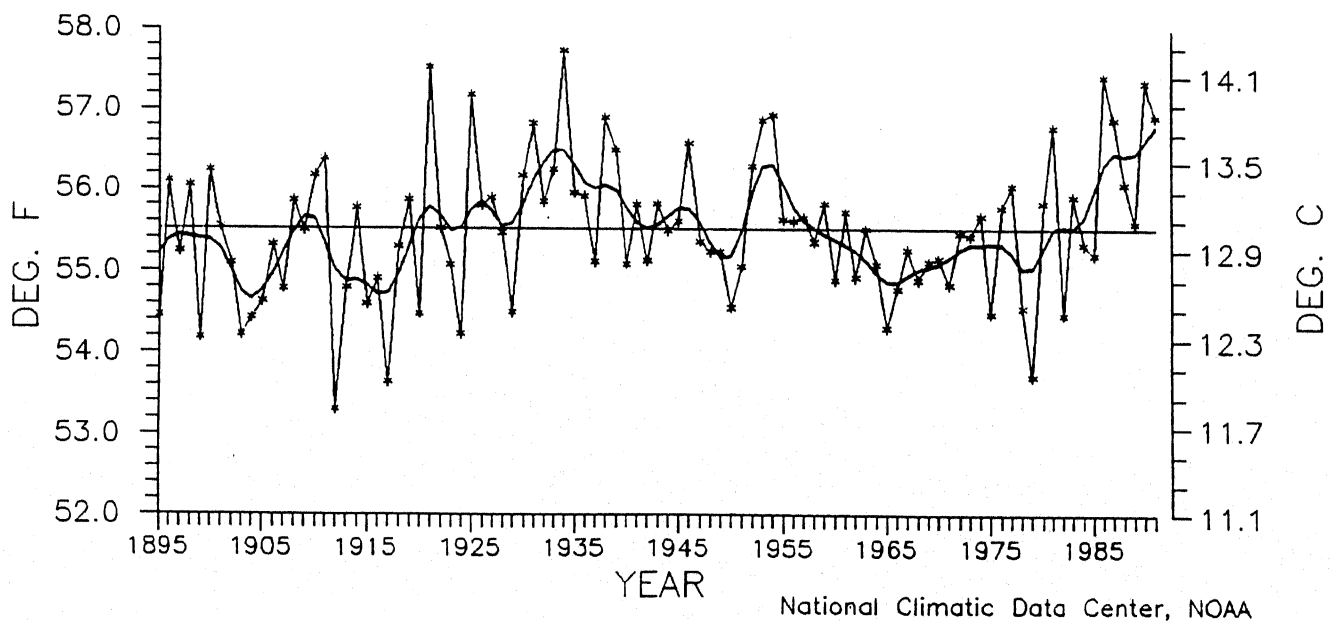
| <i>STATE</i> | <i>RANK</i> | <i>STATE</i> | <i>RANK</i> | <i>STATE</i> | <i>RANK</i> | <i>STATE</i> | <i>RANK</i> |
|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|
| AL | 70 | IA | 89 | NE | 89 | RI | 96 |
| AZ | 58 | KS | 91 | NV | 60 | SC | 84 |
| AR | 71 | KY | 95 | NH | 95 | SD | 90 |
| CA | 53 | LA | 66 | NJ | 97 | TN | 84 |
| CO | 70 | ME | 72 | NM | 33 | TX | 53 |
| CT | 97 | MD | 97 | NY | 95 | UT | 47 |
| DE | 96 | MA | 94 | NC | 94 | VT | 91 |
| FL | 96 | MI | 93 | ND | 94 | VA | 96 |
| GA | 77 | MN | 93 | OH | 96 | WA | 75 |
| ID | 79 | MS | 65 | OK | 81 | WV | 96 |
| IL | 92 | MO | 89 | OR | 68 | WI | 92 |
| IN | 95 | MT | 88 | PA | 96 | WY | 88 |

National Climatic Data Center

Top 10 rankings : **BOLD**

Bottom 10 rankings : *Italics*

**U.S. NATIONAL TEMPERATURE
JANUARY-SEPTEMBER, 1895-1991**



January - September Nationally Averaged Temperatures, 1895-1991, as Computed by the National Climatic Data Center. *The year so far has been unusually warm, ranking as the 7th warmest January - September period on record. January - September temperatures have averaged significantly above normal for five of the last six years.*

PRECIPITATION RANKINGS FOR JAN-AUG 1991, BASED ON THE PERIOD 1895 TO 1990. 1 = DRIEST, 97 = WETTEST.

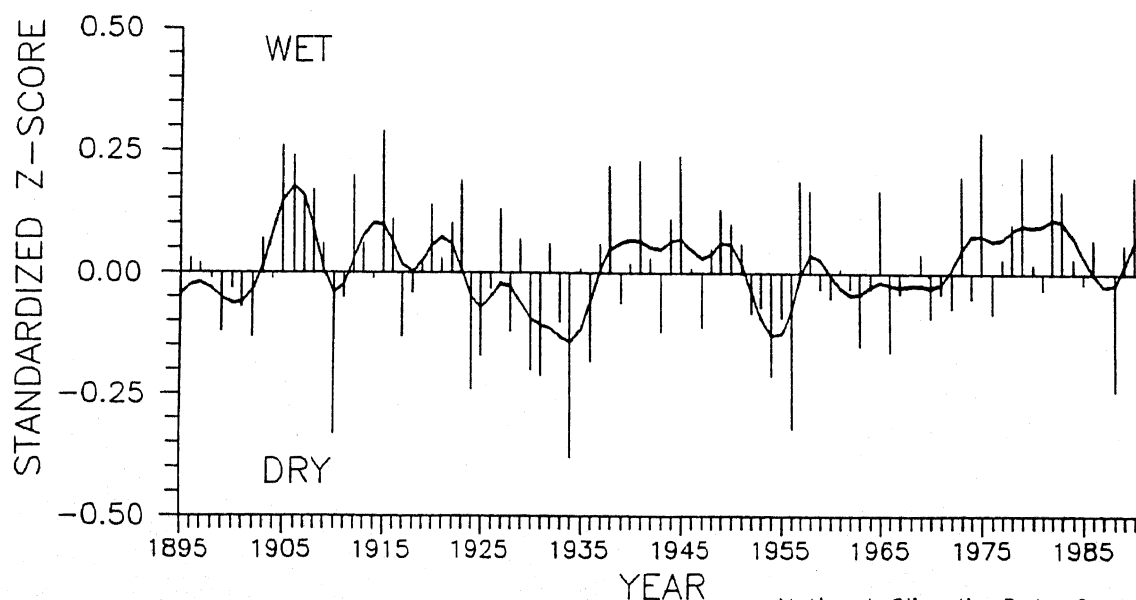
| <i>STATE</i> | <i>RANK</i> | <i>STATE</i> | <i>RANK</i> | <i>STATE</i> | <i>RANK</i> | <i>STATE</i> | <i>RANK</i> |
|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|
| AL | 92 | LA | 74 | NE | 26 | RI | 69 |
| AZ | 30 | KS | 15 | NV | 55 | SC | 87 |
| AR | 81 | KY | 31 | NH | 77 | SD | 84 |
| CA | 55 | LA | 97 | NJ | 62 | TN | 79 |
| CO | 63 | ME | 49 | NM | 79 | TX | 90 |
| CT | 75 | <i>MD</i> | 9 | NY | 25 | UT | 46 |
| DE | 63 | MA | 71 | NC | 58 | VT | 62 |
| FL | 97 | MI | 59 | ND | 71 | VA | 28 |
| GA | 93 | MN | 90 | <i>OH</i> | 7 | WA | 65 |
| ID | 32 | MS | 96 | OK | 59 | WV | 19 |
| IL | 16 | MO | 19 | OR | 39 | WI | 72 |
| IN | <i>10</i> | MT | 79 | <i>PA</i> | 6 | WY | 72 |

National Climatic Data Center

Top 10 rankings : **BOLD**

Bottom 10 rankings : *Italics*

U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX
JANUARY–SEPTEMBER, 1895–1991

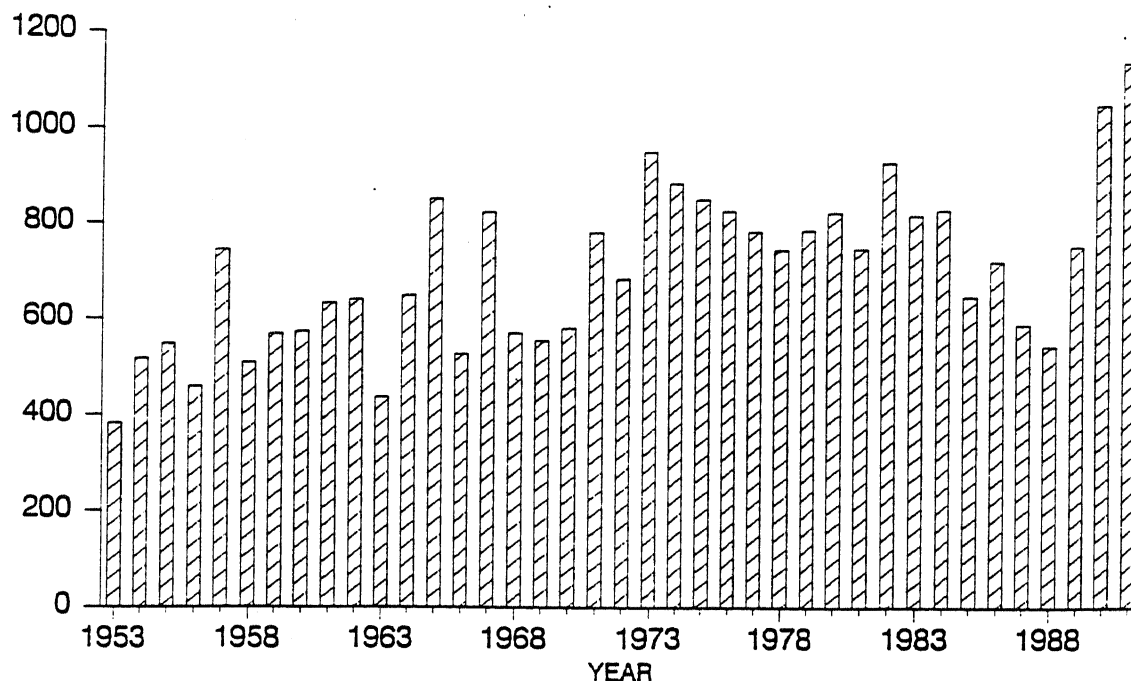


National Climatic Data Center, NOAA

January – September Nationally Averaged Precipitation Index, 1895–1991, as Computed by the National Climatic Data Center. *January through September 1991 was the 29th wettest such period, primarily due to the wet Spring nationwide and heavy summer rainfall from the southern High Plains eastward to the south Atlantic coast. This index takes local normals into account, so that typically wet areas do not dominate the index value. This is the third consecutive year with above median January – September precipitation.*

TOTAL NUMBER OF TORNADES, U.S.

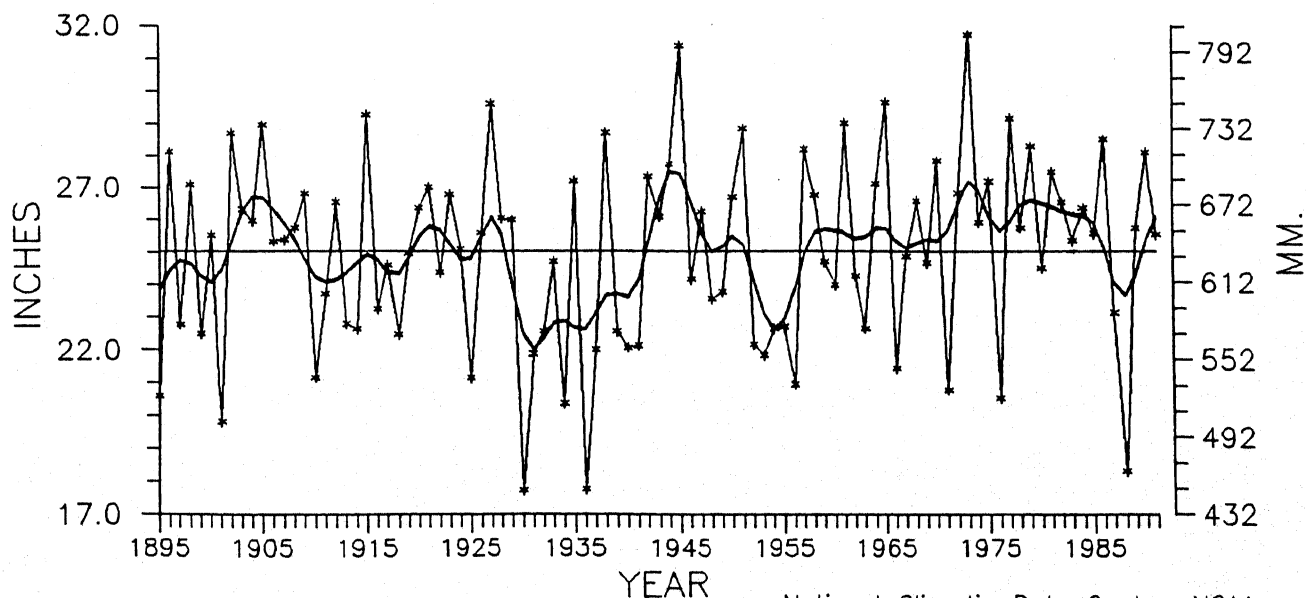
JANUARY-SEPTEMBER TOTAL, 1953-1991



National Climatic Data Center, NOAA

Total Number of Tornadoes in the Contiguous U.S., January - September, 1953 - 1991. *There were 31 tornadoes in the United States in September 1991, which is just below the average of 39. The January - September, 1991 total of 1130 is a record and well above the mean of 690; however, 1991 data is preliminary and may be over-estimated by 10% - 20%, as was the case in 1990.*

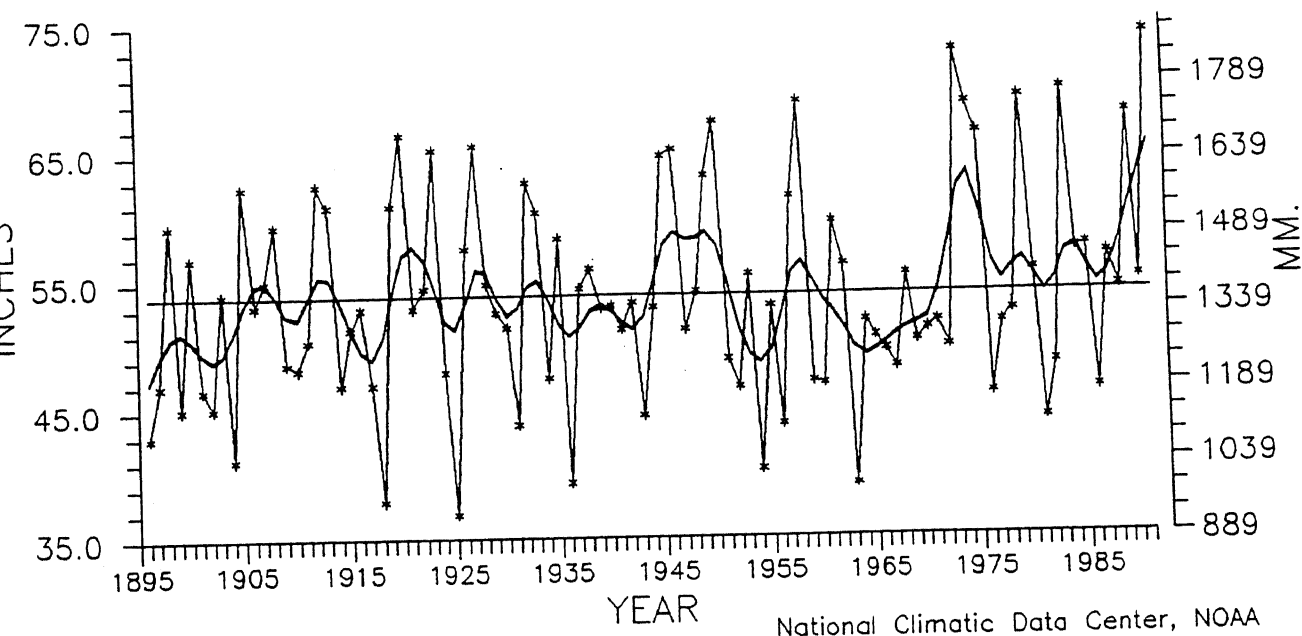
PRIMARY CORN AND SOYBEAN BELT PRECIPITATION MARCH-SEPTEMBER, 1895-1991



National Climatic Data Center, NOAA

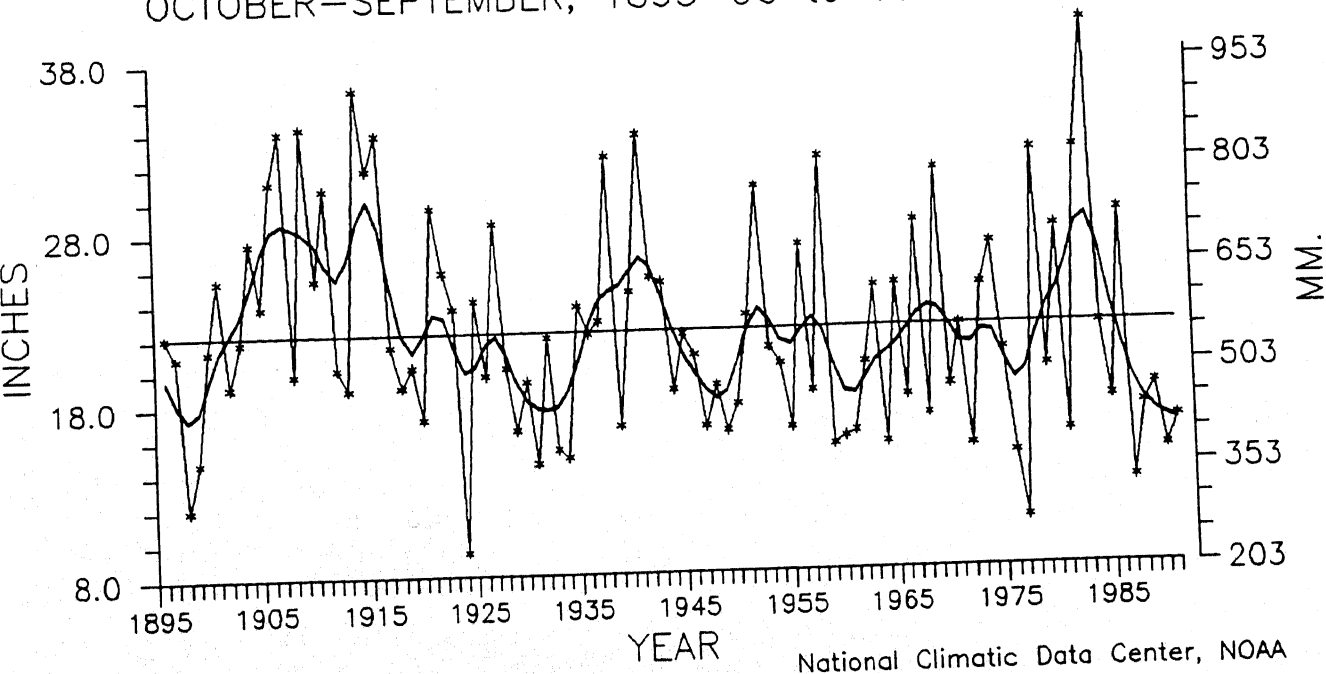
March - September Precipitation Across the Primary Corn and Soybean Belt 1895 - 1991. *Despite a dry summer, precipitation again averaged above normal across the primary corn and soybean belt for the 1991 growing season (see back cover of Weekly Climate Bulletin, #91/36, dated September 7, 1991). Twelve of the last 15 years have brought above normal precipitation during the seven-month period.*

LOWER MISSISSIPPI RIVER BASIN PRECIPITATION OCTOBER–SEPTEMBER, 1895–96 to 1990–91

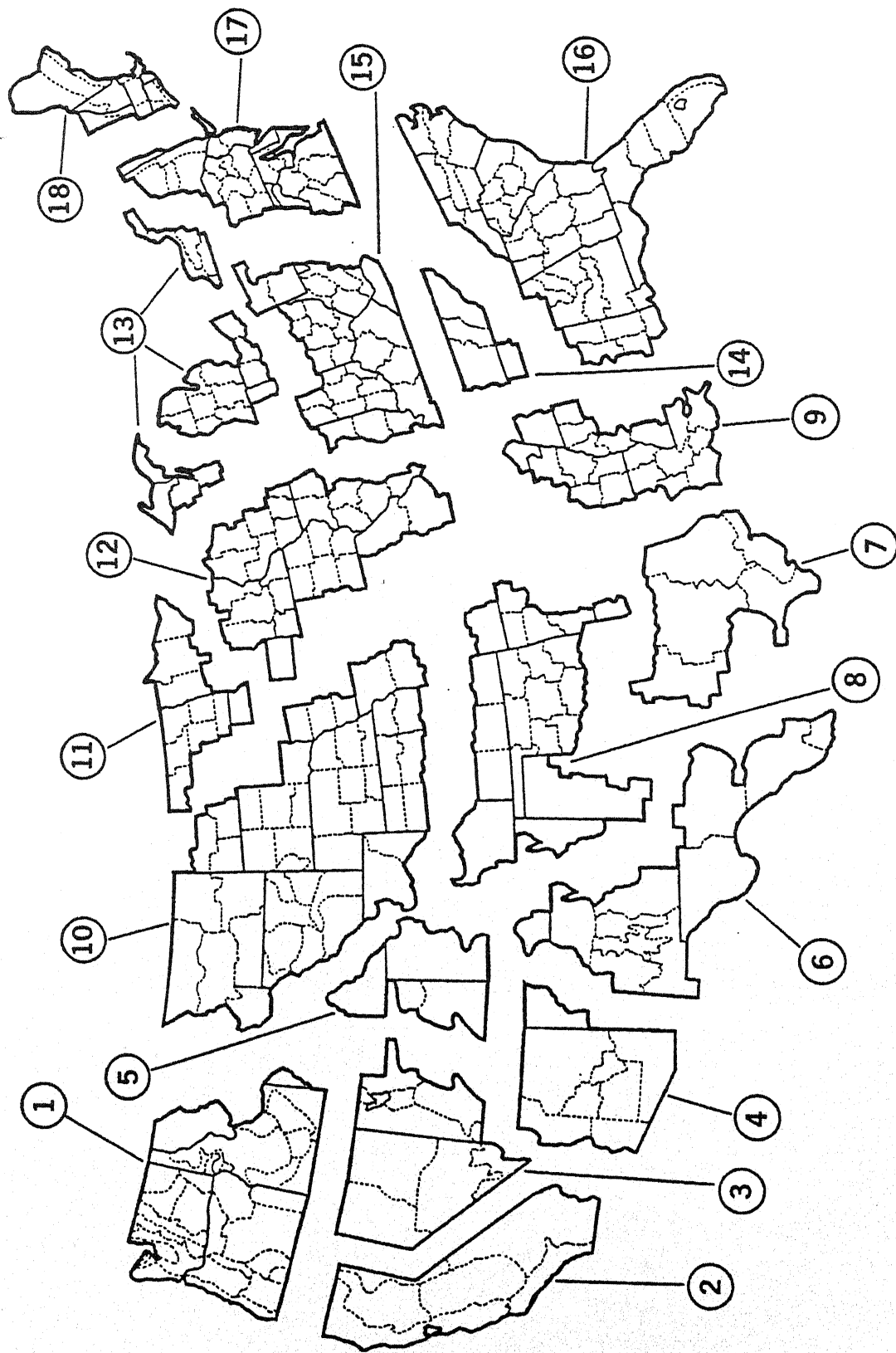


October – September (Hydrologic Year) Precipitation Averaged Across the Lower Mississippi River Basin (top) and Across the California River Basin (bottom), 1895 – 96 to 1990 – 91. The 1990 – 91 hydrologic year was the wettest on record in the lower Mississippi Valley (top) and the South Atlantic Gulf Basins (not shown). In contrast, the California River Basin experienced the 21st driest and 5th consecutive significantly drier than normal hydrologic year (bottom). A map of River Basins is on the opposite page.

CALIFORNIA RIVER BASIN PRECIPITATION OCTOBER–SEPTEMBER, 1895–96 to 1990–91



18 HIVEH BASINS ACROSS THE CONTIGUOUS UNITED STATES AS DEFINED BY THE NATIONAL CLIMATIC DATA CENTER [NCDC] (see page 20).



1. Pacific Northwest Basin
2. California Basin
3. Great Basin
4. Lower Colorado Basin
5. Upper Colorado Basin
6. Rio Grande Basin

7. Texas Gulf Basin
8. Arkansas-White-Red Basin
9. Lower Mississippi Basin
10. Missouri Basin
11. Souris-Red-Rainy Basin
12. Upper Mississippi Basin

13. Great Lakes Basin
14. Tennessee Basin
15. Ohio Basin
16. South Atlantic Gulf Basin
17. Mid-Atlantic Basin
18. New England Basin